Charts Depict Trend—Page 159

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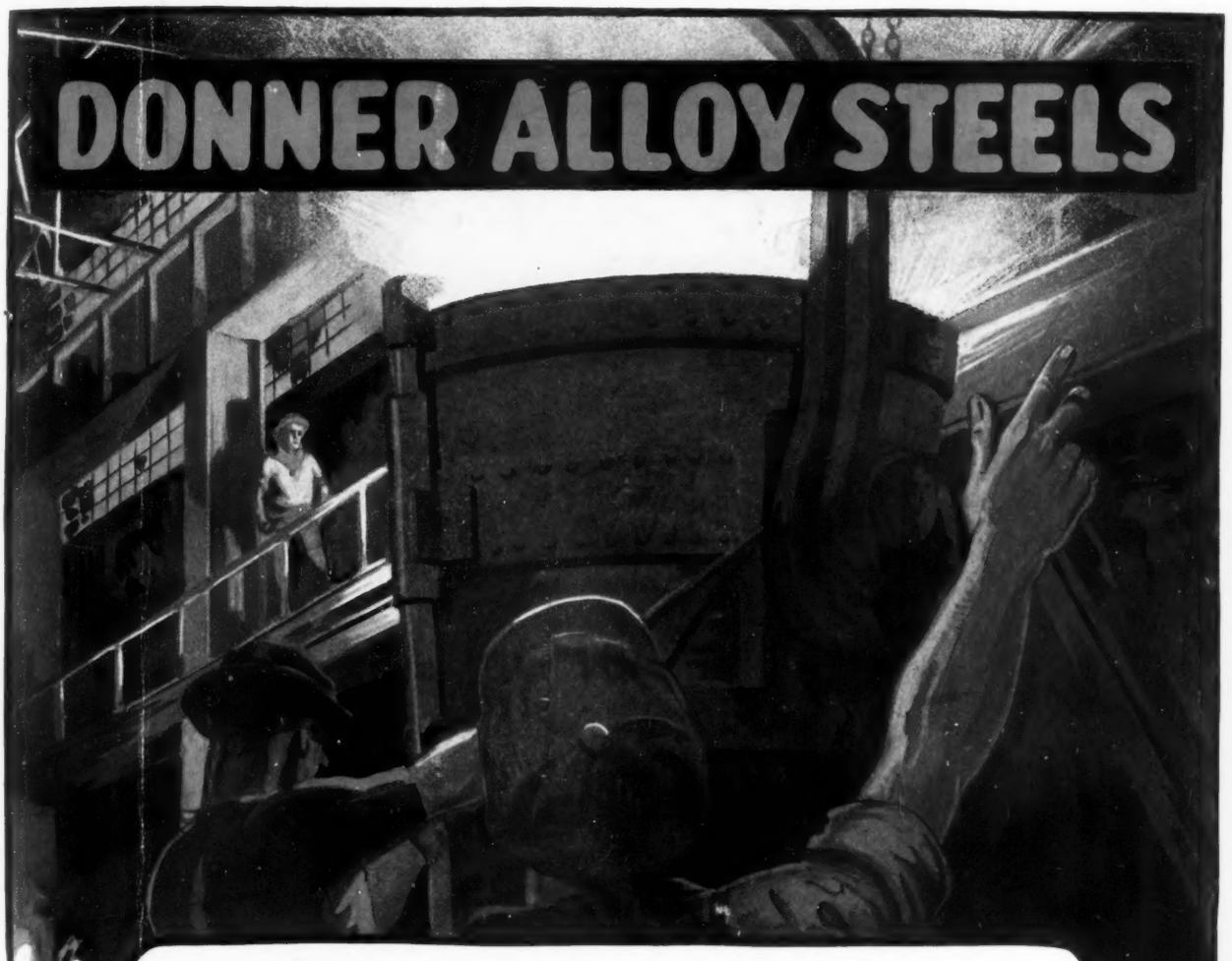

IN PLANTS where production calls for the use of Alloy or Carbon Steel of correct analysis and dependable, uniform quality, business association with the Donner Steel Company proves highly profitable.

Donner Alloy Steels are produced from high grade pig iron and specially selected scrap in Open Hearth furnaces heated with tar and coke oven gas. We use no producer gas.

Our facilities enable us to produce steel averaging lower in sulphur content, than is possible in many plants.

Furthermore, we make a special point of prompt and dependable delivery.

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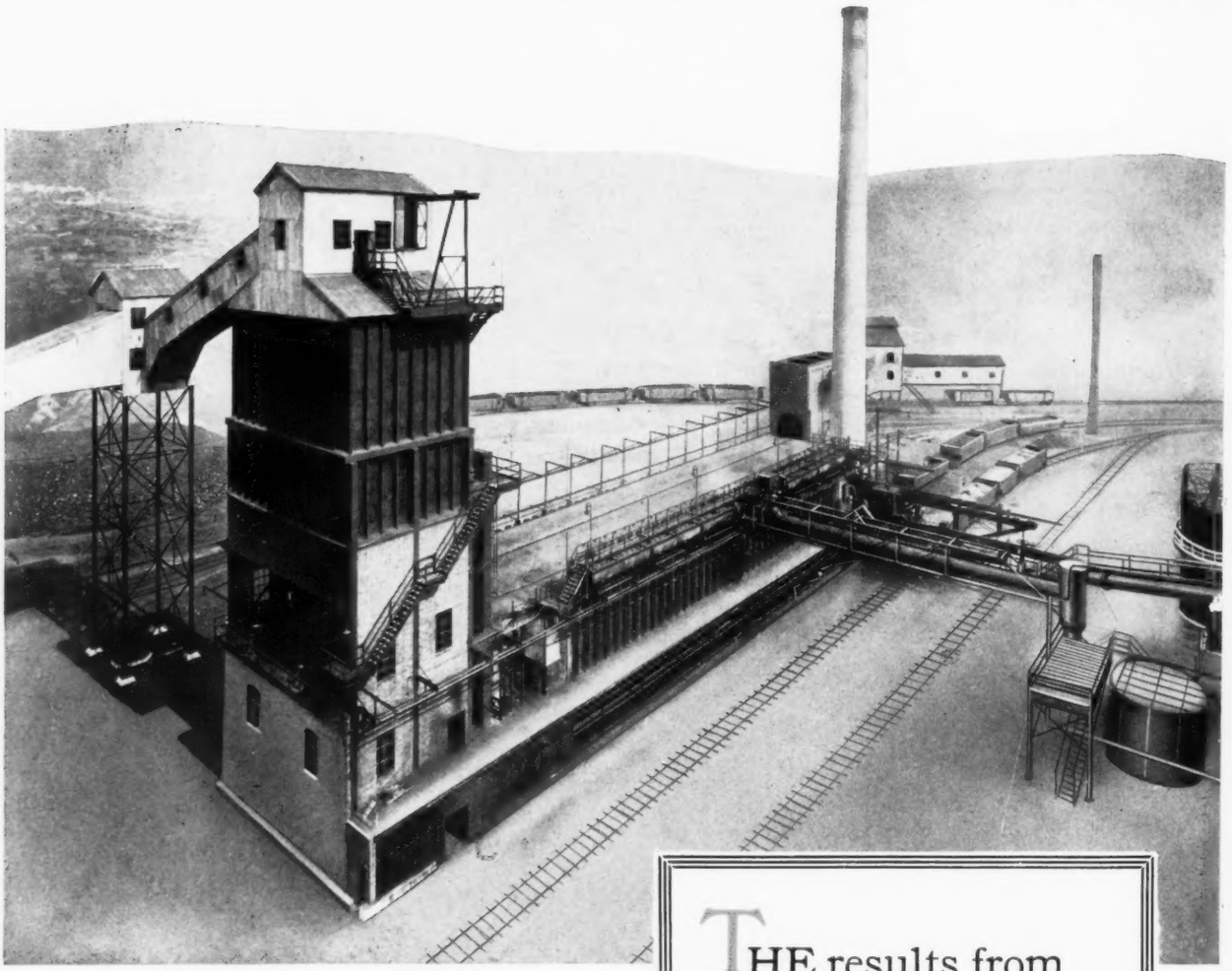
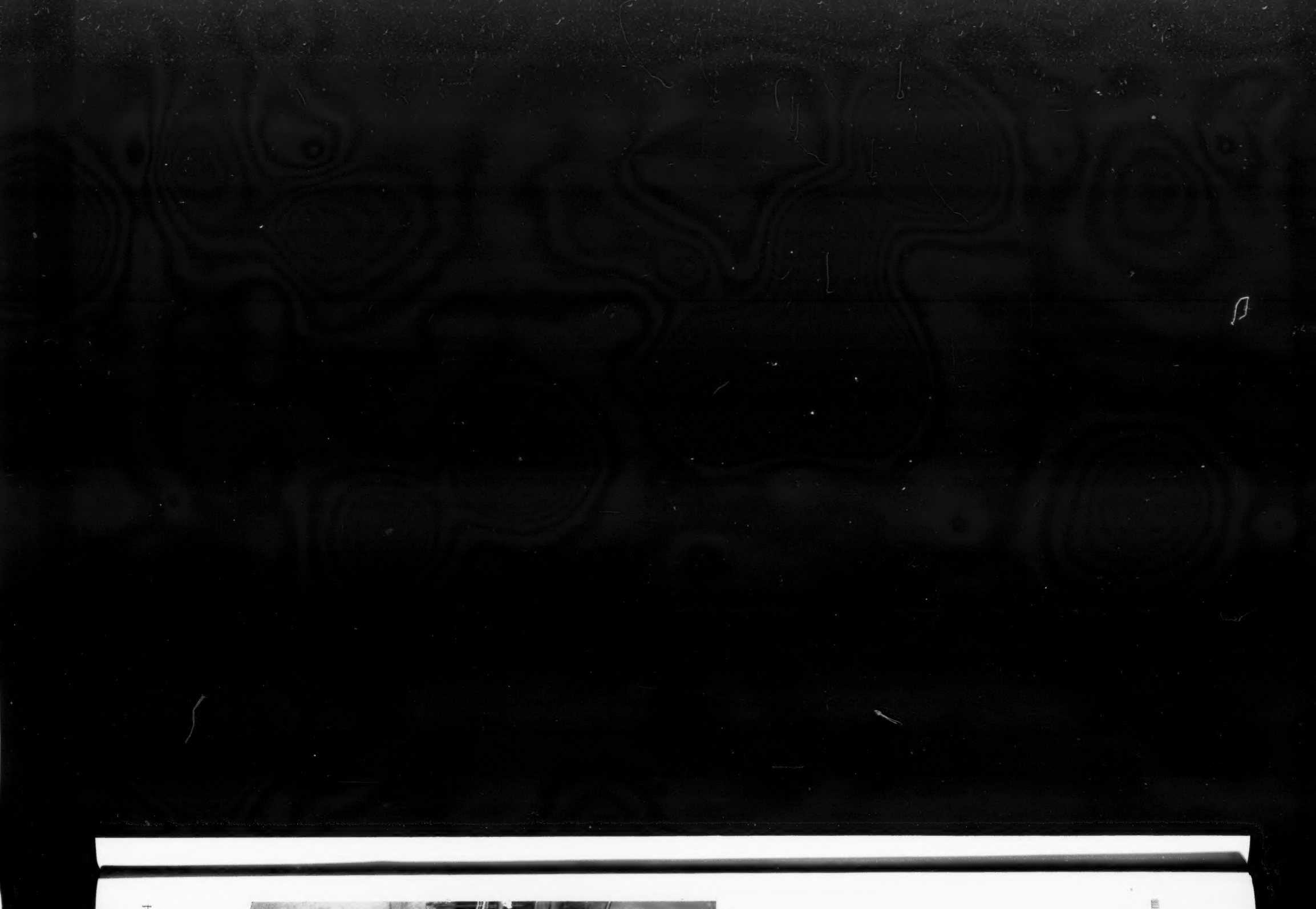
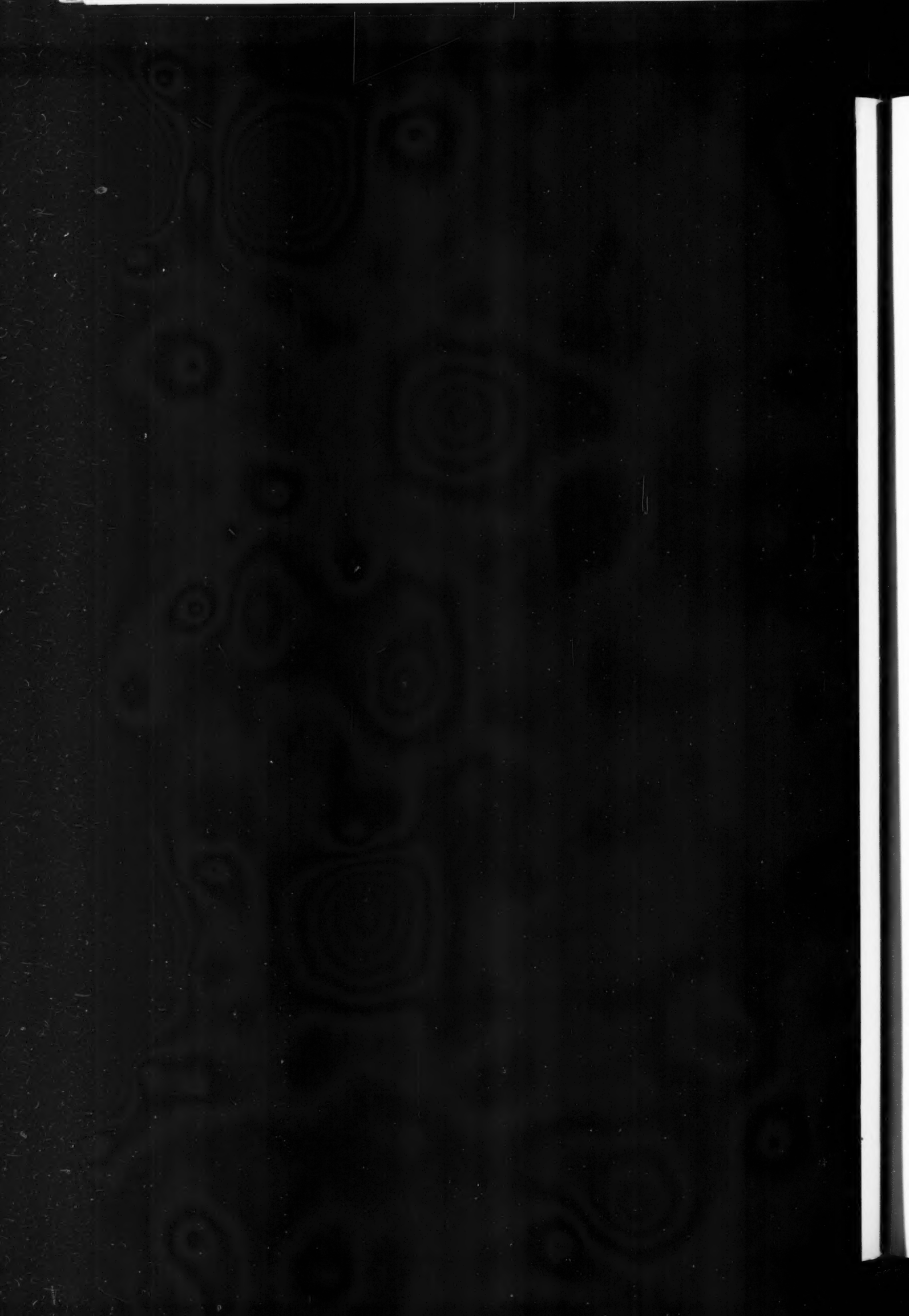


By-Product Coke Plant of
Weirton Steel Company, Weirton, W. Va.
37 Koppers Improved (Becker) Type Ovens

THE KOPPERS COMPANY
PITTSBURGH
CHICAGO

THE results from this plant have proved that Koppers Improved (Becker) Type Oven is the greatest advance made in By-Product Coke Oven design since the building of the first Koppers Ovens.





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IRON TRADE REVIEW

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The Authority of Industry *National and International*

Vol. LXXIV Cleveland, January 10, 1924 *No. 2*

New Business Appears Freely

Mill Bookings Continue To Grow and Operations Again Are on the Increase—Railroad Demands and Building Work Bring Out Large Tonnages—1923 Ingot Production Placed at 43,226,955 Tons

A FAVORABLE volume of new business has marked the first week of the new year. Low stocks of material further reduced for inventory taking and more confidence in the trade outlook and in prices, have made buyers more responsive to putting their requirements under cover, especially in manufacturing lines. The stream of incoming business is keeping up the gradual expansion which came into evidence several weeks ago. Specifications have been flowing to the mills in increased tonnage. Sentiment is the best in months.

The heavier rate of recent buying is being reflected by the tendency of general operations to expand. The Steel corporation is producing at 83 per cent of ingot and 80 per cent of finishing capacity. The Carnegie Steel Co. is back to an 88 per cent basis and at Chicago, the Illinois Steel Co. will probably bring itself up to 78 per cent this week. Independent companies in Pittsburgh and valley territory are putting on occasional steelmaking and finishing units. Several blast furnaces have been or are about to be relighted in these districts. With a number of these companies, incoming tonnage for the first time in several months now balances or exceeds shipments.

IRON TRADE REVIEW composite of 14 leading iron and steel products again moved upward this week. It shows $43.21 against $43.06 last week.

Ingot Total Is High

Final official figures for 1923 show the country last year produced approximately 43,226,955 tons of steel ingots. This is second largest total on record and falls short of 1917, high war year, by 392,245, tons less than 1 per cent. December output of ingots fell 270,040 tons from that of November, and was approximately 2,843,764 tons. This was the eighth consecutive monthly decline. With some capacity now resuming, indications point to a recovery of production in January.

Finished steel prices in general have been exhibiting a firmer tendency, but still show some variations. Some of these relate to concessions customarily granted to large buyers of the preferred class. Apparently there has been some enlargement of this list of buyers in recent months. A Cleveland mill took some plate tonnage for the New York Central and Big Four railroads at 2.40c, Pittsburgh. It appears well established that the Ford Motor Co. in its recent large purchases of forging bars on most of the tonnage at least, developed only the usual $2 concession.

Big Work Appears

The number of important projects requiring large tonnages of steel that is coming on the market, is impressive. Especially is this true in building work. This week the Ford Motor Co. awarded 12,000 to 15,000 tons for a forging and pressed steel plant at River Rouge and also 4000 tons for assembling plants in the South. This company has 15,000 to 20,000 tons for other assembling plants in the market. At New York the Mandel building requiring 20,000 tons is up for bids as is 10,000 tons for a municipal central repair shop. Boston has 20,000 tons of new construction in sight. Many smaller contracts are being figured. For two additional lake vessels just awarded, 10,000 tons of steel has been placed with two independent mills. A 6000-ton water line is up at Seattle. Building steel awards this week total 43,333 tons.

The railroads continue to be the dominating factor in new tonnage needs. The New York Central is planning the purchase of 10,000 cars and specifications will be out shortly. This system has placed the conversion of 2000 cars and St. Louis & Southwestern, 1000 box cars. The Pennsylvania is inquiring for 3000 steel box car bodies. New England roads have closed for 53,000 tons of rails.

Iron Tonnage Is Sold

Reports of some large purchases of basic iron and other grades at Pittsburgh have enlivened an otherwise quiet but steady pig iron market. Recent sales of 25,000 tons by a middleman at $21, valley apparently establish basic at that figure though some makers since have quoted $22. A current report that the leading steel interest has purchased 50,000 tons of basic at Pittsburgh is denied. A Pittsburgh buyer bought 10,000 tons of malleable and also 10,000 tons of foundry iron, both at $22, valley. Shipments of iron have been moving more briskly from the furnaces to consumers.

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Good Shipments Feature Pig Iron

Deliveries Exceeding Production With Many Representative Makers—Cheerful Tone Pervades Market, Though New Sales Are Not Heavy—10,000 Tons of Foundry Iron Closed at $22, base, Valley—Basic Still $21

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The average sales price of bessemer iron in December was $22.775, according to computation made by W. P. Snyder & Co. This compares with $23.032 in November. The average for basic was $20.857, compared with $20.801 in November.

First Quarter Buying Expected

Boston, Jan. 8.—Conflicting reports are received concerning current pig iron prices. Nearly all Buffalo furnaces hold to a $23 base, $27.92 delivered Boston, and some carload sales are reported at this figure. A Massachusetts foundry reports having purchased 100 tons of No. 2X iron during the past week at a price under $26, delivered. This is thought to have been resale iron. Eastern Pennsylvania furnaces still hold to a $23 base, with 50-cent differentials. One furnace with $3.65 freight rate into New England, while holding firmly to $23, base price, is offering No. 2X iron (2.25 to 2.75 silicon) at $23. Sales during the past week have been unusually light, the largest single sale reported being 350 tons for a Massachusetts consumer. Considerable buying seems to be in prospect as a large number of relatively small buyer sare uncovered for first quarter requirements.

New Business Small

New York, Jan. 8.—The volume of business in the pig iron market here is small. New demand continues to involve only occasional small lots for prompt and nearby shipment. As a rule, however, consumers are ordering shipments on their contracts in greater volume. Prices are unchanged. The market on eastern foundry iron continues $23, base furnace, plus 50-cent silicon differentials. Buffalo foundry continues $22, base furnace. Several sales of Virginia foundry have been made in this territory at $22.50, base furnace, plus 50-cent silicon differential.

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Buffalo, Jan. 8.—Pig iron makers are not booking much tonnage. Inquiry amounts only to 2000 to 3000 tons. The price is $23 for No. 2 plain (1.75 to 2.25 silicon) with the range up to $24.50 and $25. Malleable ranges between $23 and $23.50.

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for railroad cars and heating apparatus, are working at full schedule. No change in pig iron prices has been noted. No. 2 southern (1.75 to 2.25 silicon), is offered from $21 to $22, furnace, and northern iron of the same grade is bringing $23 to $23.50. The leading local producer continues to quote $24 to $25, f.o.b. Granite City.

Delivery Is Heavy

Birmingham, Ala., Jan. 7.—Southern furnace interests are shipping pig iron on contracts previously made but new selling is in small lots. Two prominent producers are out of certain grades for first quarter though inmost cases showed to be unusually low. Hence a cheerful feeling exists despite the fact that new business is exceedingly small in volume. The price of eastern foundry is $23, base furnace, plus 50-cent silicon differentials with occasional carload sales being made at $23.50 base. No developments are noted in basic, malleable, or gray forge in the past week. The lull extends also to low phosphorus. Copper-bearing iron continues at $28, furnace, with copper-free being nominal. English low phosphorus with copper trace continues obtainable at $28.50 to $30, delivered to Philadelphia consuming plants. Virginia foundry is higher, now being quoted at $25 to $25.50, base furnace, plus 50 per cent silicon differentials. Chateaugay furnace, Standish, N. Y., is expected to resume soon on copper-free low phosphorus iron.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Jan. 9 1924	Dec., 1923	Oct., 1923	Jan., 1923
PIG IRON				
Bessemer, valley del., Pitts.....	$24.77	24.17	27.27	29.27
Basic, valley	21.00	20.50	23.75	25.90
Basic, eastern del., eastern Pa...	23.50	23.30	24.00	27.70
*No. 2 foundry, del. Pitts.....	23.77	23.77	25.17	28.77
*No. 2 foundry, Chicago.....	23.50	23.00	25.60	28.80
*Southern No. 2, Birmingham...	21.00	20.75	20.20	23.30
*Southern Ohio, No. 2, Ironton.	22.50	22.50	23.90	27.90
**No. 2X, Virginia furnace.....	25.50	24.50	25.00	27.50
**No. 2X, eastern del., Phila..	24.26	24.26	24.51	29.56
Malleable, valley	22.00	21.50	23.25	27.75
Malleable, Chicago	23.50	23.00	25.60	28.80
Lake Superior charcoal, Chicago	29.04	28.80	30.05	33.15
Gray forge, val. del. Pittsburgh	23.27	23.27	24.52	27.77
Ferromanganese, del., Pitts.....	113.79	113.79	112.79	109.79
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh.	42.50	42.50	42.50	37.50
Sheet bars, open-hearth, Pitts....	42.50	42.50	42.50	37.50
Billets, bessemer, Pittsburgh.....	40.00	40.35	41.50	37.50
Billets, open-hearth, Pittsburgh..	40.00	40.35	41.50	37.50
FINISHED MATERIAL				
Steel bars, Pittsburgh.....	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.08
Steel bars, Philadelphia	2.72	2.72	2.72	2.385

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Jan. 9 1924	Dec., 1923	Oct., 1923	Jan., 1923
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.62	2.62	2.62	2.365
Iron bars, Chicago mills.....	2.40	2.40	2.40	2.35
Beams, Pittsburgh.....	2.50	2.50	2.50	2.05
Beams, Philadelphia	2.72	2.72	2.72	2.385
Beams, Chicago.....	2.60	2.60	2.60	2.18
Tank plates, Pittsburgh.....	2.50	2.50	2.50	2.05
Tank plates, Philadelphia.....	2.72	2.72	2.72	2.385
Tank plates, Chicago	2.60	2.60	2.60	2.18
Sheets, blk., No. 28, Pittsburgh.	3.75	3.75	3.75	3.35
Sheets, blue anl., No. 10, Pitts.	3.00	2.95	3.00	2.50
Sheets, galv., No. 28, Pittsburgh	5.00	4.90	5.00	4.35
Wire nails, Pittsburgh.....	3.00	3.00	3.00	2.70
COKE				
Connellsville furnace	3.75	3.85	3.85	8.25
Connellsville foundry, ovens.....	4.25	4.80	4.80	9.00
OLD MATERIAL				
Heavy melting steel, Pittsburgh.	20.00	18.35	16.10	21.65
Heavy melting steel, eastern Pa.	17.50	16.80	15.50	19.70
Heavy melting steel, Chicago...	16.25	16.50	14.50	18.70
No. 1 wrought, eastern Pa....	19.50	19.00	18.00	22.25
No. 1 wrought, Chicago.....	17.00	16.50	15.30	19.40
Rails for rolling, Chicago.....	18.00	17.30	16.25	20.55

Composite Market Average

Representing the Combined Average Prices Per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago.

Jan. 9, 1924	Jan. 2, 1924	Dec., 1923	Oct., 1923	Jan., 1923	Jan., 1914
$43.21	$43.06	$43.02	$43.84	$41.17	$23.03

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

creased demand will see another furnace or two started. Two smaller furnace companies still insist on $22 and are selling little. Quotations still hold at $21 to $21.50 per ton, with the latter paid by local consumers and those buying in lots of from one to three or five cars at a time. Production is being maintained at the pace reported in December. The Woodward Iron Co. and the Alabama company each has a furnace being relined. The Sloss-Sheffield Steel & Iron Co. is disposing of the iron from four blast furnaces and also shipping from surplus stock.

Shipments Heavy on Contract

Philadelphia, Jan. 8.—Heavy shipments of pig iron are being made to consumers on first quarter contracts to replace stocks which inventories in

Sell Stove Plant

Application of Riffe Pope, receiver of the Monitor Stove Co., Cincinnati, for the sale of the entire plant to two concerns to be organized by Cincinnati brokers for that purpose, will be heard by Judge Stanley Roettinger in the Hamilton county common pleas court, Jan. 12. The Monitor Realty Co. will be formed to buy all the plant except raw material and finished work, at an agreed price of $500,000. The Monitor Furnace Co., then would lease the plant, a syndicate raising $225,000 in cash as a working capital for that company. Payment of the $500,000, according to the proposal, will be by the Monitor Realty Co., issuing $500,000 of 6 per cent bonds, which will be given to the Monitor Stove Co. The Monitor Furnace Co., would guarantee interest on the bonds.

Radio Company Expands

Plant B of the Thomas J. Corcoran Lamp Mfg. Co., Cincinnati, has been sold for $150,000 to the Crosley Mfg. Co., of that city. The present plant of the Crosley company, Alfred and Cook streets, will be converted into a parts factory. The additional plant will make the Crosley company the largest manufacturer of radio sets and radio parts in the world. The new location contains about 85,000 square feet of floor space. The company intends to increase the production of radio sets from 1000 to 5000 a week.

Japan Selling Tin Plate

Tokio, Japan, Dec. 27.—The attempt of the government steelworks to establish a domestic tin plate industry is proving successful. Another lot of 150 tons has been marketed at ruling prices. The works are installing three more furnaces purchased in England, at Yawata. They will add 300 tons to the plant's monthly production of tin plate and 250 tons to the black sheets.

Iron and Steel Prices

SCRAP PRICES, PAGE 192, WAREHOUSE PAGE 186, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 190

Pig Iron

Prices per gross ton

Bessemer, valley	$23.00
Bessemer, Pittsburgh	24.77
Basic, valley	21.00 to 22.00
Basic, Pittsburgh	22.77 to 23.77
Basic, Buffalo	23.00
Basic, del., eastern Pa.	23.25 to 23.75
Malleable, valley	22.00 to 22.50
Malleable, Pittsburgh	21.77 to 24.77
Malleable, Chicago	23.50
Malleable, Buffalo	23.00 to 23.50
Malleable, del., eastern Pa.	24.00 to 25.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	24.76 to 25.26
No. 1X, Buffalo	24.00 to 25.00
No. 2 foundry, valley	22.00 to 22.50
No. 2 foundry, Pittsburgh	23.77 to 24.27
No. 2 foundry, Buffalo	23.00
No. 2 foundry, Chicago	23.50
No. 2 foundry, Granite City	24.00 to 25.00
No. 2 foundry, Ironton furnace	22.50 to 23.00
No. 2 foundry, Cleveland, del.	23.00 to 23.50
No. 2 foundry, del., Phila.	23.76 to 24.26
No. 2 foundry, N. J. tidewater	24.13 to 24.76
No. 2X, eastern del., Phila.	24.26 to 24.76
No. 2X, east. N. J. tidewater	24.63 to 25.26
No. 2X, eastern del., Boston	26.65 to 27.65
No. 2X foundry, Buffalo fur.	23.50 to 24.00
No. 2X, Buffalo, del. Boston	26.92 to 27.92
No. 2 southern, Birmingham	21.00 to 21.50
No. 2 southern, Cincinnati	25.05 to 26.05
No. 2 southern, Chicago	27.01 to 28.01
No. 2 southern, Philadelphia	28.80 to 29.80
No. 2 southern, Cleveland	27.01 to 28.01
No. 2 southern, Boston (rail and water	27.91 to 28.91
No. 2 southern, St. Louis	26.17 to 27.17
No. 2X, Virginia furnace	25.00 to 25.50
No. 2X, Virginia, Phila.	29.77 to 30.27
No. 2X, Virginia, Jersey City	30.04 to 30.54
No. 2X, Virginia, Boston	30.92 to 31.42
Gray forge, eastern Pa.	23.25 to 23.50
Gray forge, val. del., Pitts.	23.27
Low phos., standard, valley	29.00
Low phos., standard, Phila.	29.50 to 30.00
Low phos., Lebanon, furnace	28.00
Charcoal, Birmingham	32.00 to 33.00
Charcoal, Superior, Chicago	29.04

Silvery Iron

Jackson County, Ohio, furnace

7 to 8 per cent	31.00
8 to 9 per cent	32.50
9 to 10 per cent	34.50
10 to 11 per cent	36.50
11 to 12 per cent	39.00
12 per cent	41.50

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	41.50
11 to 12 per cent	44.00
12 to 13 per cent	46.50

Ferroalloys

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	$109.00 to 110.00
Ferromanganese, delivered, Pittsburgh	113.79 to 114.79
Spiegeleisen 19 to 21 per cent furnace or tidewater	38.00 to 39.00
Ferrosilicon, 50 per cent contract freight allowed	75.00
Ferrotungsten standard, cents per pound contained	85.00 to 90.00
Ferrochrome, 60 to 70 chromium, 6 to 8 carbon, cents per pound contained, delivered	10.00
Imported ferrochrome, 4 to 6 per cent carbon	nominal
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Prices per net ton

Connellsville furnace	$3.75 to 4.25
Connellsville foundry	4.75 to 5.50
New River foundry	11.00 to 12.00
Wise county furnace	5.00 to 5.75
Wise county foundry	5.75 to 7.00
Alabama furnace	5.00 to 6.00
Alabama foundry	5.50 to 6.50

By-Product

Foundry, Newark, N. J., del.	$10.91
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	12.50
Foundry, Granite City, Ill.	12.50
Foundry, Alabama	5.00 to 6.50

Semifinished Material

Prices per gross ton

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$40.00
Open-hearth, Youngstown	40.00
Open-hearth, Philadelphia	45.17
Bessemer, Pittsburgh	40.00
Bessemer, Youngstown	40.00
Forging, Pittsburgh	45.00
Forging, Philadelphia	50.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$40.00
Youngstown	40.00

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh	$51.00

Standard extras, $2.50 per ton over ¼-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $5 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	2.35c to 2.40c
Universal skelp, Pittsburgh	2.35c to 2.40c
Sheared skelp, Pittsburgh	2.35c to 2.40c

Shapes, Plates and Bars

Prices per pound

Structural shapes, Pittsburgh	2.50c
Structural shapes, Phila.	2.67c to 2.82c
Structural shapes, New York	2.69c to 2.84c
Structural shapes, Chicago	2.60c
Tank plates, Pittsburgh	2.50c
Tank plates, Philadelphia	2.67c to 2.82c
Tank plates, New York	2.69c to 2.84c
Tank plates, Chicago	2.60c
Bars, soft steel, Pittsburgh	2.40c
Bars for cold finishing, Pitts.	2.55c
Bars, soft steel, Philadelphia	2.72c
Bars, soft steel, New York	2.74c
Bars, soft steel, Chicago	2.50c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c
Bars, rail steel, mill	2.10c to 2.20c
Reinforcing bars, billet, Pitts.	2.40c
Bar iron, common, Phila.	2.62c to 2.67c
Bar iron, common, New York	2.64c to 2.69c
Bar iron, common, Chicago	2.40c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Prices per pound

Hoops, Pittsburgh, under 5 in.	3.00c
Hoops, Pittsburgh, 20 gage, under 1 in.	3.35c to 3.50c
Bands, Pittsburgh	3.00c
Cold finished steel bars, Pittsburgh base	3.00c
Steel shafting, Pittsburgh	3.00c
Cotton ties, bundle 45 lb. Pittsburgh	$1.67

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 32.50
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.05c to 3.15c
Spikes, small railroad, Pitts.	3.40c to 3.50c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.10c
Track bolts, Pitts. Standard	4.00c
Track bolts, Pitts., small	4.75c to 5.00c
Track bolts, Chicago	4.10c
Tie plates, Pittsburgh	2.55c to 2.60c
Tie plates, Chicago	2.60c

Spike, tie plate and truck bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Prices per pound

Wire nails, Pittsburgh	3.00c
Galv'd nails, 1-inch and over	5.25c
Plain wire, Pittsburgh	2.75c
Annealed wire, Pittsburgh	2.90c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c
Barbed wire, painted, Pitts.	3.45c
Barbed wire, galv., Pitts.	3.80c
Polished staples, Pittsburgh	3.45c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pittsburgh	2.70c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Prices per pound

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburg stamping quality	3.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.00c

Sheets

SHEET MILL BLACK

Prices per pound

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.07c to 4.17c
No. 28, open-hearth, Chicago	4.09c to 4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c

GALVANIZED

No. 28, open-hearth, Pitts.	5.00c
No. 28 bessemer, Pittsburgh	5.00c
No. 28, open-hearth, Phila.	5.22c to 5.32c
No. 28, open-hearth, Chicago	5.19c to 5.34c

BLUE ANNEALED

No. 10, open hearth, Pitts.	3.00c
No. 10, bessemer, Pittsburgh	3.00c
No. 10, open-hearth, Phila.	3.22c to 3.32c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c

Tin Plate

Prices per 100-pound box

Tin plate, coke base, Pitts.	$5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Prices per net ton

Class B Pipe

Four-inch, Chicago	$59.20 to 60.20
Six-inch and over, Chicago	55.20 to 56.20
Four-inch, Birmingham	51.00 to 52.00
Six-inch and over, Birmingham	47.00 to 48.00
Four-inch, New York	65.60 to 66.60
Six-inch and over, New York	60.60 to 61.60

Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $5 higher than Class B.

Scrap in Better Demand

All Markets Feel Pressure of Buying and Quotations Move Upward Slowly—Consumers Hold Back but Necessity Brings Sales

SCRAP PRICES, PAGE 192

Chicago, Jan. 8.—Consumers still remain aloof from the iron and steel scrap market but dealers display increased confidence. They are offering $16.75 for steel scrap for delivery to the Inland Steel Co. when that interest resumes acceptance of shipments. The market is bolstered somewhat by the strength of scrap in the Valleys and it is pointed out that in view of the $4.50 freight rate to Cleveland an increase of $1 per ton on steel scrap in Cleveland will move tonnage from this district. Demand for foundry and blast furnace grades is good. Rolling mill and low phosphorus are quiet. Railroad offerings include 4650 tons by the Illinois Central, 5000 tons by the Union Pacific, 3200 tons by the Santa Fe, 1100 tons by the St. Paul and 250 tons by the Monon.

Scrap Demand Sustained

Boston, Jan. 8.—Heavy melting steel continues to move freely to Pennsylvania points, and especially Pittsburgh, from New England. One Pittsburgh consumer offers $19.50 delivered which means local dealers can afford to pay about $13 and this should be possible now. A Connecticut consumer of heavy melting steel has been able to buy some tonnage at $14.50 delivered. Borings and turnings are in fair demand at $9.50.

Eastern Market Good

New York, Jan. 8.—Buying of scrap is confined largely to heavy melting steel and mixed borings and turnings. Tonnage is going into Eastern Pennsylvania and the Pittsburgh district, borings and turnings chiefly in the latter case. Eastern Pennsylvania consumers are paying $17, delivered, for No. 1 railroad steel, and $12.50, delivered for mixed borings and turnings. Pittsburgh consumers are paying $15 to $15.50, delivered, for the latter grade. Clean cast borings and turnings are moving freely, particularly the latter, for which $15, delivered, Harrisburg and Phoenixville, Pa., is being paid. Borings for shipment to these points are going at around $14, delivered. Cast scrap and wrought materials are sluggish, although the only advance of the week was made in wrought pipe, for which dealers are now paying $12.75 to $13.25, New York.

Strong at Cleveland

Cleveland, Jan. 8.—Strength appears in iron and steel scrap. Consumers are taking more interest and tonnage is being acquired in considerable volume although individual sales are small. Dealers also are having difficulty covering on contracts, several instances being noted where prices close to or above contract figures were paid. Advances affecting practically the entire list have been made within the past few days.

Carnegie Buys Further

Pittsburgh, Jan. 8.—With an additional sale of at least 12,000 tons of heavy melting steel scrap to the Carnegie Steel Co. at $20 per ton, following two smaller sales to nearby independent steel companies on the same basis, that market is clarified and can be quoted at $20. Next purchases probably will be at $20.50 or higher since dealers who took the $20 orders are today bidding $20 to cover. Several grades are up 50 cents to $1 or more per ton over a week ago and a factor is the high price being bid on railroad lists. Steel on a list of the Pennsylvania railroad is said to have brought $21.60. One nearby consumer is offering $17.25 for No. 1 busheling and this grade, formerly quoted at $16 to $16.50 is up $1 per ton. Cast iron borings have sold at as high as $16.50 and are up 50 cents. A small 200-ton lot of heavy breakable cast brought $19.50 although some users are offering only $19. A carload of rerolling rails brought $22 and on larger tonnages $22.50 could be done except at Cumberland, Md., and Williamsport, Pa., where $20 to $20.50 represents the market. Hand bundled and hydraulic compressed sheets have little sale here but the market is strong in the Weirton, W. Va., Steubenville and Youngstown, O., districts where around $17.50 for bundled sheets and $19 for compressed is easily obtained.

Good Aggregate Buying

Philadelphia, Jan. 8.—Large transactions in iron and steel scrap are lacking but good miscellaneous buying aggregates a fair total. This includes steel and cast grades for several mills. The market continues strong and a number of grades are quoted somewhat higher.

Shows Strength at Detroit

Detroit, Jan. 7.—The iron and steel scrap market continues to display strength with most prices advanced 50 cents a ton. Heavy melting steel and like grades have been moved up $1 a ton.

Small Demand at St. Louis

St. Louis, Jan. 8.—While buying of iron and steel scrap is not large bargains are sought. Prices are firm, and dealers are bullish. Yard stocks are not large, and cold weather already has cut down the movement to some extent. Most mills are comfortably supplied for first quarter and except for a few specialties are not urgently in the market.

(*Concluded on page* 155)

Sheet Bars Firm and Active

SEMIFINISHED STEEL PRICES, PAGE 139

Pittsburgh, Jan. 8.—Good tonnages of semifinished material are being booked. Several contracts each involving 5000 tons or more at a time have been closed for delivery in the first quarter. In sheet bars the aggregate tonnage has been particularly large. They include one lot of about 3600 tons for the Parkersburg Iron & Steel Co. All have carried the $42.50 level, that price being firm. The Apollo Steel Co. is understood to have closed on its requirements. The makers of blue annealed sheets are reported to be paying $42.50 for slabs, although some slab contracts have been taken at $40, the same price on 4 x 4-inch rerolling billets.

Two or three billet users have covered their requirements and are getting up specifications. The Superior Steel Corp., the West Leechburg Steel Co. and others are now under cover. The Bethlehem Steel Co. reports that some small billets have brought higher than $40, and one or two of the smaller billet users have paid as high as $42.50 where the regular $2.50 differential over 4 x 4-inch billets has been asked. Several tonnages now are up for negotiation which probably will be closed this week. A number of forging billet users have closed at $45, Pittsburgh, which figure generally is quoted. A number of inquiries for 200 to 500 tons at a time now are current.

Many Contracts Closed

Youngstown, O., Jan. 8.—Numerous contracts for first quarter sheet bars involving many thousands of tons, have been signed in the past week by producers here. The price specified in all contracts was $42.50, Pittsburgh or Youngstown. Commitments have been heavy, and one producer will not consider further accounts unless conditions warrant the starting of an additional blast furnace and open-hearth equipment. Another producer has plenty of room for first quarter semifinished reservations. The full price of $42.50, Pittsburgh or Youngstown, is being quoted against spot or future shipment of sheet bars, while slabs and billets are being quoted at $40. One producer is holding these commodities on the same basis as sheet bars.

Semifinished More Active

Cleveland, Jan. 8.—A Cleveland consumer of sheet bars has readily consented to the payment of $42.50, Youngstown, on a good size tonnage for shipment in January. Makers are not having any difficulty in obtaining this price on sheet bars, but users of billets are objecting to $42.50, though some of them have had to accept this price to obtain the material. Billet sales are not as numerous as those of sheet bars. Many inquiries for sheet bars, billets and slabs have been issued since the first of the year. The leading maker in this district has committed its entire tonnage for the first quarter, and is not quoting. Among the inquiries is one for 2000 tons of sheet bars for a consumer in northern Ohio for prompt delivery. A strong feature of the situation is that users having contracts are specifying heavily. The leading makers' shipments are going forward faster than in many weeks.

Eastern Sales Moderate

Philadelphia, Jan. 8.—Moderate tonnages of billets have been placed here for first quarter. Such weakness as characterized the market a few weeks ago, is not in any way reflected in the business now being

entered. The price is $40, base Pittsburgh, equivalent to $45.17 delivered Philadelphia, for rerollers, and $45, base Pittsburgh, for forging quality. Most first quarter requirements still are to be placed.

More Activity

Characterizes the Ferroalloy Market—Ferromanganese Tonnage Is Sold

FERROALLOY PRICES, PAGE 139

Pittsburgh, Jan. 8.—Ferroalloy activity has been fairly extensive. In the past week sales aggregating between 4000 and 5000 tons of domestic ferromanganese have been noted at the full price of $109, seaboard base. These involve lots of 100 to 1000 or 2000 tons. Recent buying has been sufficient to leave American producers well committed for the first quarter with some orders for second quarter. One maker with a capacity of less than 5000 tons monthly has little tonnage left this side of late March or April. This price of $109, seaboard base, carries with it a discount of ½ of 1 per cent for cash within 10 days after cars are loaded at producers' plants.

Other alloys are quiet after the recent contracting activity. The Pittsburgh Steel Foundry Co. is in the market for its requirements of 50 per cent ferrosilicon for the first half, 50 to 150 tons. It also wants a carload of ferromanganese. Some inquiries up to 50 tons at a time are out on ferrochrome on which 10 cents is quoted. Some sellers have offered slight concessions. The 50 per cent grade of ferrosilicon is still quoted at $75, freight allowed. Spiegeleisen consumers have been closing their first quarter and first half requirements. At the moment no large inquiries are before the trade. In quantity the metal is quoted at $38 for 16 to 19 per cent. On two to three carloads $39 is asked and $40 on single carloads. Prices on 16 to 19 per cent are $1 less.

English Ferro Is Sold

New York, Jan. 8.—More activity is reported in the manganese metals. Several inquiries have come out for ferromanganese for the first quarter and at least 1000 tons of English metal have been sold for this position at the full price of $110 duty paid tidewater. Recent sales of spiegelesien totaled several hundred tons. Several small inquiries are pending. The spiegelesien market continues $38 to $40 furnace for the 20 per cent grade.

Most of the contract business in ferrosilicon and ferrochrome has been placed for 1924. The contract price for 50 per cent ferrosilicon is $75, delivered. Ferrochrome prices are as follows: 4 to 6 per cent carbon, 10.75 cents; 6 to 8 carbon, 10.50 cents; 0.50 carbon, 30 cents; maximum 1 per cent carbon, 27 cents; maximum 2 per cent carbon, 25 cents. Vanadium prices are unchanged at $3.50 to $4 a pound contained, according to quantity and analysis.

Various Contracts Closed

Chicago, Jan. 8.—All the 50 per cent ferrosilicon business for the present year in this territory now has been placed on the basis of $75, freight allowed. Substantially all the ferrochrome business also has been closed. Ferromanganese is selling in carloads at $110, seaboard. Spiegeleisen is not active. The last sale was at $48.50, delivered.

Coke Market Still Dull

Dover, O., Furnace Closes for 12,000 to 14,000 Tons Monthly—First Quarter at $4.25—Foundries Specifying More Freely

COKE PRICES, PAGE 139

Pittsburgh, Jan. 8.—Since a Dover, O., furnace interest covered for the first quarter for 12,000 or 14,000 tons monthly at $4.25, the market for furnace coke has become dull again. No furnaces now are inquiring for tonnages. Only small lots are being sold in the spot market, bringing $3.75 to $4. Demand for heating coke shows little life, one to five carloads being sold at a time at $3.25 to $3.50, although before the last cold spell it could be had at $2.75 to $3. Most foundry coke users are covered on contracts, and while some shipments were suspended over the holidays foundries now are specifying freely and taking full allotments. Prices below $4.75 usually apply to off grade or poor coke. Those makers quoting $6 are getting little or no business. The majority of the present small orders are going at $5 to $5.50. Premium prices of $6.50 to $7 still rule on two brands. Production of coke, according to the *Connellsville Courier*, for the week ended Dec. 29 was 165,530 tons as compared with 195,420 tons in the preceding week.

Buying at Normal Rate

Boston, Jan. 8.—Coke sales throughout New England continue at a normal rate, although there is nothing unusual in the market. The by-product producers are quoting the December price for January delivery, namely $12.50, delivered New England foundries.

Close First Half Contracts

New York, Jan. 8.—Current business in coke is restricted almost entirely to demand for foundry fuel for spot and January shipment. The current market on standard beehive foundry coke for spot shipment is $4.75 to $5.25, Connellsville, although higher prices have been done on special brands. In some cases spot coke is bringing $6.50. The Seaboard By-Products Coke Co. continues to quote $10.91, delivered at Newark and other northern New Jersey consuming points for standard by-product foundry coke and this interest during the past week has closed some additional contracts for first half shipment.

Inquiries for Small Lots

Cincinnati, Jan. 8.—Sales of coke in this territory are not brisk, but inquiries for small lots are fairly numerous. The Louisville & Nashville railroad closed for 300 tons of New River foundry coke for shipment to Louisville, Ky. A sale of 300 tons of Connellsville foundry coke to a user in this district for second quarter is noted. The price was $6.50 a ton. The situation is slightly stronger than a fortnight ago. Furnace coke continues inactive, though sellers have offered concessions. A slight stiffening in the price of Connellsville foundry coke is noted. Quotations now range from $5 to $6.50, ovens, for contract and spot delivery. Pocahontas coke producers report an improved demand, while New River foundry coke sales are growing in volume. Practically no demand exists for the furnace grade.

Foundry Demand Moderate

St. Louis, Jan. 8.—Deliveries of domestic coke during the past week have been heavier than during any single month in almost a year. Yards which were congested have reduced their surplus. Some improvement in demand for coke for industrial purposes is reported, although stocks in yards of by-product makers are large. Selling foundry coke is moderately active. Many users have provided for their first quarter requirements, and others are waiting until after inventory before making commitments. Sales reported are mainly of by-product coke, the price for which remains unchanged at $13.50, ovens.

Shipping for Domestic Use

Birmingham, Ala., Jan. 7.—A slight improvement is noted in the coke market, but not sufficient to warrant an increase in production. Considerable amount of coke is being shipped for domestic purposes.

Tin Plate

Domestic Market Strongly Fortified—Operations Averaging 90 Per Cent

TIN PLATE PRICES, PAGE 139

Pittsburgh, Jan. 8.—The domestic market on tin plate continues strongly fortified by reason of heavy tonnages booked for delivery over the first half with actual specifications in the hands of makers including the American Sheet & Tin Plate Co. for all they can produce and ship between now and March 1. March specifications are not due until Jan. 15 and before this time next week these undoubtedly will have been received. Tonnages of tin plate for case oil goods have been offered here on a re-export basis at prices below the $5.50 per base box Pittsburgh level but have been refused. One involving 60,000 base boxes offered at $5.41½ and $5.30 is understood to have been taken by an eastern Pennsylvania tin plate maker at the latter level. Lower prices prevail on tonnages of this character because some of the freight rate is refunded upon presentation of documentary evidence that the material finally is shipped abroad as is true of case oil. Operations fast are returning to the averages maintained prior to the holidays. The American Sheet & Tin Plate Co. starts this week on a 97 per cent basis and independents are averaging around 90 per cent.

Milwaukee Die Casting Co., 297-301 Fourth street, Milwaukee, has increased its capital from $75,000 to $150,000. The new issue consists of $50,000 common and $100,000 preferred stock. The company specializes in bearings and other die cast products for the automotive and machinery industries.

Steel Bar Sales Are Better

Free Specifications on Orders Most Impressive Sign of Present Market —All Users Anxious To Provide Supply—Prices Hold Firmly

BAR PRICES, PAGE 139

Chicago, Jan. 8.—Makers of soft steel bars are well satisfied with the volume of business they have taken on since the holidays. Jobbers have bought liberally. Automotive interests are buying more heavily. Implement manufacturers have not contracted so heavily in many months. The leading interest has been booking more soft steel bars than it has been shipping. It appears that the impetus looked for after the holidays has made itself felt. The soft steel bar price is unchanged at 2.50c, Chicago.

Some rail steel bar mills that have been operating from one week to the next now have three to four weeks' business ahead. This is a better situation than they have enjoyed in three months. The rail steel bar market, however, has much room for improvement. The price continues 2.30c, mill.

Bar iron still is rather sluggish and most mills are just able to maintain one turn. The quotation is 2.40c, Chicago.

Specifying for First Quarter

Pittsburgh, Jan. 8.—While hesitation and moderation still exists in some quarters in booking merchant steel bar requirements, many consumers have fully covered for the first quarter and already have issued actual specifications for about 50 per cent of the tonnages involved. In fact one valley producer whose customers have all covered reports that one of its large tonnage buyers already has specified out the January and February allotments. Various consuming lines are represented, chiefly automotive, passing through the cold drawn bar finishers. These contracts all were taken at the full 2.40c, base Pittsburgh, price which means 2.55c for bars for cold finishing. Other makers report similar progress toward general improvement and the Youngstown Sheet & Tube Co. this week is putting on its 12-inch mill. Refined iron bars are firm at the 3.25c, base Pittsburgh, minimum and from that up to 5.00c still is quoted.

Bar Consumers Delay

New York, Jan. 8.—Current demand for steel bars is estimated around 60 to 70 per cent of capacity. Most consumers are inclined to delay in taking action on first quarter requirements. The price of steel bars is firm at 2.40c base Pittsburgh.

Mill Tonnage Is Growing

Cleveland, Jan. 8.—Mill orders of liberal size and in an increased aggregate continue to be placed by bar consumers in this territory. Since the first of the year the tonnage moving through local sales offices by way of specifications has been keeping up with increased volume of late December and is showing a tendency to still further expand A number of additional contracts have been placed by manufacturing consumers and invariably the price prevailing has been 2.40c, Pittsburgh. Exceptions to this figure have been few and have applied to the larger consumers of the preferred class. It develops a large part of the recent Ford Motor Car tonnage did not develop beyond the usual $2 concession to large preferred buyers. A local mill is credited with having taken about 15,000 tons of this business. A large part of the tonnage it is understood went to a Pittsburgh mill. The total amount placed is not known definitely but it is reported to be in excess of 50,000 tons.

Buying Still Currently

Philadelphia, Jan. 8.—Steel bar demand appears to be at 60 to 70 per cent of normal with more first quarter tonnages being placed. Consumers generally continue to buy currently although some is being done for jobbers stocks. Price on steel bars is firm at 2.40c, Pittsburgh. Considerable concrete bar tonnage has been placed. It is understood that the Pennsylvania railroad has placed its first quarter requirements for spring steel.

First Quarter Buying Heavy

Boston, Jan. 8.—Most New England bar consumers covered for first quarter tonnage during the past week at 2.40c base Pittsburgh. Sales were more than double the average through December. Prices below 2.40c are rare. One of the low sellers is now out of the market and it is believed only one other company has offered anything below 2.40c since the middle of December.

Specify for Cold Drawn

Pittsburgh, Jan. 8.—Actual orders rather than contracts are a feature of the cold-drawn steel bar market. These are sufficient in number and size to permit lining up finishing schedules for some time and producers are better off than if they had large contracts with meager specifications. Many orders are for small lots but several involve up to 500 tons each and a few of even larger dimensions have been received since the first of the year. In fact one automotive interest has just placed specifications with a large independent mill here for almost 2000 tons. The 3.00c base Pittsburgh price is firm although local makers are equalizing freight rates when necessary to compete with the Chicago interest naming a Chicago base figure.

Specify Freely on Bolts, Nuts and Rivets

NUT AND BOLT PRICES, PAGE 190

Pittsburgh, Jan. 8.—The general improvement pervading the steel market extends to nuts, bolts and rivets, several additional orders being received the past week. A further revision in the price of cold-punched square or hexagon blank or tapped nuts, $4.25 off list being the prevailing quotation instead of $4. Hot pressed square or hexagon blank or tapped nuts are unchanged at $4.50 off list. Other quotations are the same as they have been for a few weeks past, on the basis of 60 and 10 off for large machine bolts. A fairly large number of carload orders have been accepted and a few larger tonnages. Jobbers and users alike have been active as buyers. Practically the same condition applies to rivets on the basis of 2.90c with smaller quoted at 60, 10 and 5 off. Producers will soon be able to increase their operations, the general average at present being 65 per cent of capacity.

Specifications are Good

Chicago, Jan. 8.—The leading maker of bolts and nuts reports specifications and new business good. Some makers are somewhat pressed for business but demand generally for bolts and nuts is heavy. Automotive interests are good buyers. Prices in the Chicago district are firm at 60 and 10 off as the base but rivet prices are somewhat shaky owing to competition to the East.

Demand is Restricted

Philadelphia, Jan. 8.—Demand for bolts, nuts and rivets here is restricted mainly to contract specifications. All eastern makers quote 60 and 10 off on large machine bolts and 2.90c, on rivets. The market generally is firm.

Hoops in Demand

Pittsburgh, Jan. 8.—Hoops and bands are firm at a minimum of 3.00c base Pittsburgh, certain sizes carry much higher figures, particularly hoops 1-inch wide or less on which because production is limited, higher figures such as 3.35c and even 3.50c are asked. Some satisfactory orders lately have been taken from automotive interests and stamping works, cooperage orders being rare. These orders have run from a single carload up to 300 to 400 tons at a time.

Celebrate 44th Year

Cincinnati, Jan. 8.—Rogers, Brown & Co. celebrated the forty-fourth anniversary of the founding of the organization, with meetings in Cincinnati Jan. 3, 4 and 5. Sales representatives and a number of the principals of the concerns represented by the company were present. Business sessions were held at the Business Men's club, Jan. 3, and on the following day there was a luncheon at the Hotel Gibson, and a party at the home of D. B. Meachan in the evening. The meeting concluded Saturday with a business session at the company's offices in the Carew building.

Implement Exports Grow

Washington, Jan. 8.—Exports of agricultural implements from the United States in November gained in value by more than $500,000 over the October exports, according to a statement issued by George B. Bell, chief of the agricultural implement division, department of commerce. November exports were valued at $3,807,223, as compared with October exports of $3,224,780.

November exports exceeded by 100 per cent or more those of the corresponding month in 1922, and for the 11 months ended with November they amounted to $46,973,191, as compared with

$22,606,033 for the corresponding period of 1922. The 11 months' total is greater than the total for 1913, considered as a normal prewar year.

Inventory Season Felt in Warehouse Trade

WAREHOUSE PRICES, PAGE 186

Cleveland, Jan. 8.—Buying of iron and steel through warehouse for mill delivery is being resumed on a larger scale. Inquiries and orders are good. Manufacturers are placing requirements for first quarter. Business out of warehouse continues to drag, with little activity expected before spring although many dealers must replenish stocks diminished for inventory taking. Manufacturers are specifying ahead, a practice neglected in the past few months. Prices are firmer with little shading being heard of.

Sheet Prices Unsteady

Chicago, Jan. 8.—St. Louis and St. Paul warehouse sheet prices are reflecting the unsteadiness that characterized Chicago prices about six weeks ago. Black sheets at St. Louis are down to 4.75c and galvanized sheets to 5.75c. The range on galvanized sheets at St. Paul is 5.75c to 6.00c. Competition in nails out of Chicago warehouse has become keener, resulting in a spread of $3.10 to $3.25 per keg on cement-coated and $3.65 to $3.80 per 100 pounds on common wire nails.

Stock Trading Is Limited

Detroit, Jan. 8.—Trade among iron and steel jobbers is rather limited but during the holiday season it was above that of previous years. Dealers are well stocked with supplies in anticipation of a resumption of buying. The advent of cold weather has caused some hesitancy about taking on small structural shapes which had been purchased because of large amount of building in force at the year's end. Indications point to an early resumption of buying of bands, bars and hoops.

Ore On Lake Erie Docks 7,981,432 Tons

ORE PRICES, PAGE 190

Cleveland, Jan. 8.—Iron ore on Lake Erie docks Jan. 1 was 1,252,181 tons less than the tonnage Jan. 1, 1923, the Lake Superior Iron Ore association reports. The amount is 9,233,613 tons as compared with 7,981,432. Receipts of ore at Lake Erie ports during the past season total 43,666,071 tons, and shipments to furnaces 33,503,976 tons. The association gives the following tabular comparisons for the season:

Port	Receipts	Shipments	Balance on dock Jan. 1, 1924
Colborne, Ont.	5,514,114	1,407,160	168,752
Erie	1,381,122	1,481,332	332,078
Conneaut	8,949,478	8,586,861	1,736,756
Ashtabula	10,499,368	9,864,623	2,293,909
Fairport	2,224,441	2,143,588	362,126
Cleveland	8,977,251	6,175,561	1,525,522
Lorain	3,497,905	1,696,569	669,031
Huron	1,105,902	1,216,841	675,183
Toledo	1,516,490	931,441	218,073
Total Lake Erie	43,666,071	33,503,976	7,981,432
One year previous	31,709,923	21,781,251	9,233,613

Plate Business Is Moderate

Eastern Mills Unable To Sustain Heavy Operations That Followed Holiday Shutdown—Two Lake Boats Let—2.40c Quoted to Railroads

PLATE PRICES, PAGE 139

Pittsburgh, Jan. 8.—Although no large plate tonnages are up for consideration in the form of inquiries for oil storage tanks a Midland, Pa., fabricator reported to have received an order for ten 55,000-barrel tanks from the Mexican Petroleum Co., may shortly be in the market. This award has not been confirmed. Recent awards involve one, two or three small tanks each, and the individual tonnages are not sufficiently large to be important market factors. Some fairly large tonnages for railroad cars are understood to be ready for placing. Fabricators generally report inability to secure prices below 2.50c, base Pittsburgh, from the mills. Some contracts have been taken for first quarter requirements at that level. Activities are increasing due to the accumulation of orders. A Mahoning valley producer is this week putting into operation its 109-inch plate mill, which has been idle for some time.

New Year Starts Well

Chicago, Jan. 8.—Like other finished steel products, plates are riding on the crest of a post-holiday boom. Demand is not exceptional from any one quarter but the total volume of business booked is comfortable. Two makers are booking slightly more than they are shipping At present no oil storage tanks are out or in prospect. The finished steel that local mills will contribute to the Southern Pacific railroad award of 6555 freight cars will aggregate 40,000 tons, a good part of it plates. Other good tonnages of plates for car requirements are in sight. Plate makers have not been disappointed in their belief the turn of the year would see consumers satisfied both as to price and the prospects of increased consumption. The plate quotation is 2.60c, Chicago.

Eastern Plate Business Fair

Philadelphia, Jan. 8.—Current plate demand is fair, but eastern mills are unable to continue operating at the heavy rate of last week. Several projects including the holders for the United Gas Improvement Co. are held up temporarily, a canal transportation company has placed five steel barges with an eastern yard. The Pennsylvania railroad is in the market for 500 to 1000 tons of boiler and firebox steel. Prices are unchanged at 2.35c to 2.50c, Pittsburgh, depending on attractiveness of tonnage.

Boat Steel Is Placed

Cleveland, Jan. 8.—About 10,000 tons of steel for two additional lake vessels taken the past week by the Great Lakes Engineering Works will be furnished by the Bethlehem Steel Co. and a Pittsburgh independent. Each will supply the material for one vessel. One of the boats is a stone carrier for Pickands Mather & Co. and the other an ore freighter for Herbert K. Oakes to be operated by the Franklin Steamship Co. This disposes of the vessel inquiries which recently have been pending before lake yards. The volume of new plate business continues heavy but in this territory is largely of a miscellaneous character. No large inquiries apart from those for lake vessels, have appeared recently. Oil field tonnage in the market is unimportant. No action has been noted on a recent lot of 3000 tons for a water line at Denver. Open market prices appear firmer than a few weeks ago despite occasional variations with reports of customary concessions granted to buyers of the preferred class. The common run of business is going at 2.50c, Pittsburgh. A Cleveland producer, however, obtained some tonnage against an inquiry of 600 to 700 tons of plates for the Big Four Railroad at 2.40c, Pittsburgh, equivalent in this case to 2.43c, Cleveland. The total inquiry of the Big Four plates, shapes and bars was about 1500 tons. This same mill also quoted 2.40c, Pittsburgh on plates to the New York Central railroad against an inquiry of the latter for first quarter shop requirements.

Newport Steel Banquets

Sales representatives and department heads of the Newport Rolling Mill Co., and its subsidiary plants, the Andrews Steel Co. and the Globe Roofing & Corrugating Co., were tendered a dinner at the Hotel Sinton, Cincinnati, last week. More than 150 were present. C. H. Sloan, manager of the steel plant, was toastmaster. Addresses were made by A. K. Andrews, president of the rolling mill company; J. B. Andrews, president of the steel company; H. M. Davis, general superintendent of the rolling mill and George Moeschl, general sales manager.

Will Operate Better

Chicago, Jan. 8.—An increase in general operations of the Illinois Steel Co. from 75 to about 78 per cent this week is probable. This company continues to have 19 of its 27 steel works blast furnace stacks blowing. The general rate of operations of the Inland Steel Co. still is 75 per cent. Zero weather has been a retarding factor at all mills for the past few days but milder temperature has increased operation.

Offers Steel Stock

New York, Jan. 8.—In accordance with the stock subscription plan of the United States Steel Corp., the finance committee, according to statement by Chairman E. H. Gary, has decided to offer to employes of the Steel corporation the privilege of subscribing during the month of January for 100,000 shares of common stock at the price of $100 per share.

Concrete Buying Steady

Many Small Lots of Reinforcing Bars Continue To Be Awarded But Larger Buyers Hesitate To Close—Prices Show Some Weakness

REINFORCING BAR PRICES, PAGE 139

Cleveland, Jan. 8.—More reinforcing concrete bar orders were awarded during the past week than for some time past. Bourne-Fuller Co. was awarded 500 tons for two local buildings. Concrete Steel Co. took 100 tons for a job in Wheeling, W. Va., and Massillon Reinforcing Bar Co., 150 tons for a Cleveland garage. Inquiries are not being brought out in larger quantities but individual jobs require heavier tonnages. More work is being figured than was on the boards in December. Prices for stock material hold firm at 2.75c, base Pittsburgh. Although 2.10c, mill, is the going quotation on rerolled bars little tonnage is in the market to test its strength. Some interests lately have been very aggressive for business in this territory and it is reported they have gone as low as 2.00c, Pittsburgh, or lower on billet steel bars to capture desirable business.

Inquiry Much Improved

Boston, Jan. 8.—While concrete bar demand has been light during the past few weeks inquiry at the present time is much improved and most dealers look for several large tonnage contracts during the coming week. The only recent order of importance was 500 tons for the Naumkeag Steam Cotton Co., Salem, Mass.

Encouraging Tonnage in Prospect

Pittsburgh, Jan. 8.—An encouraging amount of concrete bar tonnage is in prospect, numerous inquiries being current. The price situation is not at all pleasing to those fabricators who have to depend upon current purchases at the mill figure of 2.40c, base Pittsburgh. Liquidation prices still rule, such as 2.15c or 2.20c, base Pittsburgh, and competition is exceedingly keen. The Philadelphia warehouse for the Gulf Refining Co. involving about 500 tons went to the Fort Pitt Bridge Co.

Lettings Still Are Meager

Cincinnati, Jan. 8.—Demand for concrete bars continues of meager proportions. Lettings during the past week were of small consequence. New projects are fewer, the most important being an addition to the stadium for the University of Cincinnati involving 100 tons. Despite the dullness, prices have not dropped below the Pittsburgh level and warehouses are not offering concessions. Considerable road work is scheduled for early placement.

Holiday Lull Still Felt

Chicago, Jan. 8.—Reinforcing concrete bar business has not recovered from the holiday letdown and while some good tonnages are in prospect, few have come to a head recently. The Corrugated Bar Co. has taken the bars for a retaining wall for the Art institute, Chicago, and for a building for the Neuhoff Packing Co., Nashville, Tenn.; each containing about 90 tons. Practically all of the large office building projects coming to a head in January will contain several hundred tons of bars each. The reinforcing bar quotation continues 3.00c, Chicago.

CONCRETE CONTRACTS PLACED

Awards this week ..... **5,847 tons**
Awards two weeks ago..... **605 tons**
Awards three weeks ago..... **3,245 tons**

725 tons, Santa Fe railroad storehouse, Topeka, Kan., to Kansas City Bolt & Nut Co.
600 tons, building for Continental Can Co., Chicago, to Olney J. Dean & Co.
600 tons, Tacoma hotel, Tacoma, Wash., to Pacific Coast Steel Co.
500 tons, plant addition, Naumkeag Steam Cotton Co., Salem, Mass., to Corrugated Bar Co.
500 tons, warehouse building at Philadelphia for Gulf Refining Co., to Fort Pitt Bridge Co.
400 tons, Russell-Miller flour mill, Buffalo, N. Y.; to Corrugated Bar Co.
350 tons, footings for Brotherhood of Locomotive Engineers Bank building, Cleveland, to Bourne-Fuller Co.
315 tons, substructure for Hetch Hetchy Dumbarton bridge, San Francisco, to local mill.
275 tons, bridge between Elizabethtown and Pittsboro, N. C., to Concrete Steel Co. General contractor, Atlantic Bridge Co.
200 tons, school building, Philadelphia, to Concrete Steel Co., general contractor, M. Melody & Sons.
200 tons, bridge at Indianapolis, to Kalman Steel Co.
150 tons, garage on Prospect avenue for Private Investment Co., Cleveland, to Massillon Reinforcing Bar Co.
150 tons, German Consolidated Newspaper Co., Twelfth and Oregon streets, Cleveland, to Bourne-Fuller Co.
150 tons, Masonic Temple, San Jose, Cal., to Edw. L. Soule Co.
120 tons, Telephone Exchange building, Bush and Franklin streets, San Francisco, to Badt-Falk Co.
112 tons, road work in Orange County, Cal., to unknown contractor.
100 tons, science building, Santa Clara University, Santa Clara, Cal., to unknown fabricator.
100 tons, Lansing, Mich., waterworks, to Concrete Steel Co.
100 tons, hydroelectric plant at Andrews, S. C., to Concrete Steel Co.
100 tons, Scenery plant, Tenth and Bryant streets, San Francisco, to Gunn, Carle & Co.
100 tons, exhibition hall, Wheeling, W. Va., to Concrete Steel Co.

CONCRETE CONTRACTS PENDING

1000 tons, warehouse for Kaufmann & Bair Co.; to be placed within the next two weeks.
700 tons, Blake, Moffitt & Towne, Los Angeles; bids being received.
500 tons, hall of chemistry, University of West Virginia, Morgantown, W. Va., general contract to Forman & Putman Co., Marietta, O.
435 tons, building for S. D. Childs & Co., Chicago; bids in.
400 tons, school at Ironwood, Mich.; pending.
400 tons, various jobs by Burlington railroad; bids in.
325 tons, West Spokane street bridge approach, Seattle; bids in Jan. 11.
300 tons, Westinghouse Electric Co. plant, Emeryville, Cal.; bids in.
250 tons, warehouse, Eighteenth and Alabama streets, San Francisco; bids in.
250 tons, church, Bush and Steiner streets, San Francisco; bids in.
200 tons, Tribune Tower, Chicago; bids in Jan. 15.
200 tons, high school at Sioux City, Iowa, pending.
170 tons, Salvation Army building, Pittsburgh; general contract to Camp Construction Co., Cleveland.
150 tons, office building, Seventeenth and Broadway, Oakland, Cal.; bids in.
125 tons, building for Pittsburgh Auto Equipment Co., Pittsburgh; revised bids asked.
100 tons, state capitol building, Charleston, W. Va., general contract to George A. Fuller Co.
100 tons, Crocker Estate building, Market street; bids being received.
Tonnage not stated, bridge across Stillaguamish river for Snohomish county, Wash.; M. M. Caldwell, engineer.

Pipe Mills

Expected to Fall Behind in Deliveries Soon—Cast Buying Slackening

PIPE PRICES, PAGE 139 AND 190

Pittsburgh, Jan. 8.—By February some makers of standard full weight merchant pipe expect again to be behind on their deliveries. Orders are coming in fairly prompt from jobbers in scattered sections and while shipments lately have been heavy on backlogs fairly large tonnages of buttweld sizes remain to be delivered on old orders. Considerable improvement is rated in oil country goods. Some jobbers have released tonnages on which they asked several weeks ago to have shipments suspended. New orders for two or three carloads at a time for oil pipe have been received in the past 10 days, and pipe makers are greatly encouraged over the outlook. One or two expect shortly to be figuring on large tonnages of line pipe; some tentative inquiries lately issued are expected to turn into actual specifications at an early date. Jobbers, anticipating heavy demand are ordering larger sizes of pipe which are difficult to obtain in times of heavy demand. The price situation is strong on the basis of the April 19, 1923 cards.

Municipal Work Still Delayed

New York, Jan. 8.—Municipal demand for cast iron pipe has not as yet developed in any volume. Numerous cities have tonnages under contemplation, which likely will be brought out shortly. This is true in the case of some New England cities, which have been delaying action until a change in administration at the first of the year. New York has a substantial tonnage under consideration for early action. Prices remain unchanged.

Prices Are Firming

Chicago, Jan. 8.—A firming tendency is noted in cast iron pipe prices. Most makers are booked from three to five months ahead on various sizes, although immediate shipment could be made. Utilities have ordered well, and makers are satisfied with the market situation. The leading interest has taken 1800 tons in two jobs. Awards on 1900 tons in two projects are expected shortly.

Makers Well Booked Ahead

Birmingham, Ala., Jan. 7.—Cast iron pipe makers, gas and water pipe in particular, have received orders covering the first three quarters of the year or enough business is in sight to care for that long ahead. The American Cast Iron Pipe Co. was awarded two orders for pipe from California points, 235 tons from Palms and 648 tons from Santa Barbara. Quotations have righted themselves and promise to be maintained for an indefinite period.

Bid on Steel Pipe

Portland, Oreg., Jan. 5.—West Coast Iron & Steel Co. submitted the low bid for furnishing the Port of Portland

commission with 4000 feet of 30-inch joint shore pipe. Its bid was $14,100. The highest of five tenders submitted was $22,246. On 2000 feet of 40-inch inside diameter pontoon pipe, the Willamette Steel Pipe Co. was low with a bid of $12,700.

CAST IRON PIPE PLACED

6500 tons, Denver, to United States Cast Iron Pipe & Foundry Co.
3000 tons, Omaha, to National Cast Iron Pipe Co.
2800 tons, Public Service Co. of Northern Illinois, Chicago, to United States Cast Iron Pipe & Foundry Co.
1200 tons, Grand Rapids, Mich., utility, to United States Cast Iron Pipe & Foundry Co.
648 tons, Santa Barbara, Cal., to American Cast Iron Pipe Co.
600 tons, Kalispall, Mont., to United States Cast Iron Pipe & Foundry Co.
600 tons, Spring Wells, Mich., to Lynchburg Foundry Co.
235 tons, work for Palms, Cal., to American Cast Iron Pipe Co.
200 tons, work in Miami, Fla., to American Cast Iron Pipe Co.
146 tons, Madison, Wis., to American Cast Iron Pipe Co.

CAST IRON PIPE PENDING

2625 tons, 6 to 20-inch class D pipe, Vernon, Cal.; readvertised for bids.
2625 tons, 6 to 20 inch class D pipe for Vernon, Cal.; bids in.
1400 tons, Toledo, O.; bids in.
1164 tons, work for Sacramento, Cal.; pending.
1164 tons, 6, 8, 10 and 12-inch class B pipe for Sacramento, Cal., bids in.
1164 tons, 6, 8, 10 and 12-inch class B pipe for Sacramento, Cal.; bids in.
500 tons, New Holstein, Wis.; bids in.
187 tons, 4 and 6-inch pipe for San Bernardino, Cal.; bids opened.
186 tons, 4 and 6-inch pipe for San Bernardino, Cal.; bids in.
115 tons, 4 to 12-inch class B pipe for Glendale, Cal.; bids in Jan. 20.

Wire Active

Better Demand for Nails and Fencing and Sales Are Heavy

WIRE PRICES, PAGE 139

Pittsburgh, Jan. 8—Scattered orders for wire nails and a number of mixed carload orders from jobbers mean that a large aggregate tonnage is being accumulated by mills in this district. Despite competitive figures quoted by one or two small interests as well as one jobber naming low figures on its stocks, the orders referred to have been taken at the full market prices, 2.75c base Pittsburgh on wire and 3.00c on wire nails. Some makers quoting lower are guaranteeing prices against decline to promote sales. One or two producers find increased orders since the first of the year in woven wire fencing for spring delivery, jobbers evidently expecting a heavy buying movement on the part of their agricultural trade in March and April. Wire mill operations continue around 70 per cent of capacity, mostly on small nails used in building operation and for which the demand has been particularly heavy. In fact, jobbers' as well as mill stocks are badly depleted.

Good Volume Flowing in

Chicago, Jan. 8.—Makers of wire and wire products are not flooded by the rush of post-holiday business but they find marked improvement in demand for all classifications. This increase is especially noted in the manufacturing trade. Woven wire fence demand has increased. Operations still are at about 75 per cent of capacity but an increase seems warranted. Jobbers are buying more liberally. Prices are unchanged.

Sheet Situation Is Clearing

More Makers Take Firm Stand on Full Market Prices as Business Develops in Better Volume—Specifications Insure Larger Operations

SHEET PRICES, PAGE 139

Pittsburgh, Jan. 8.—Permits to ship sheets during the closing days of 1923 to reach their destinations following the taking of inventories, were sufficiently numerous to enable some sheet producers to approximate former shipping records. Since the first of the year heavy shipping rates have been maintained. While during the holidays operating schedules were hampered, the general average being lower by about 10 or 15 per cent, these are recovering and around 80 per cent again is true of the independent. The American Sheet & Tin Plate Co. probably will reach 85 per cent or higher this week. New buying continues to improve. According to several important producers this is particularly true of full-finished automobile sheets. So far little contracting has been done, but automotive interests are placing actual specifications. As noted by one producer this has been at the rate of 1000 or 2000 tons daily for the past 10 or 11 days, all at the full market price of 5.35c, base Pittsburgh. Blue annealed sheets are fairly active, and 3.00c, base Pittsburgh, is easily obtainable. Black sheets find a ready sale and those interests maintaining 3.85c, base Pittsburgh, report a lessening degree of competition below that level. Perhaps only three or four of the smaller producers are selling their output at 3.75c. Galvanized sheets have firmed up considerably on the basis of 5.00c, base Pittsburgh. Small orders are being placed. Fairly large tonnages will be ordered soon for box car roofs. Other grades of sheets are being ordered in good lots. Jobbers are replenishing stocks. Most sheet makers have six to eight weeks' work ahead in actual specifications.

Cover for First Quarter

New York, Jan. 8.—It is estimated that 75 per cent of the consumers and 50 per cent of the jobbers in this territory have placed contracts covering their first quarter sheet requirements. Prices are stronger. Blue annealed sheets are firm at 3.00c base, Pittsburgh, equivalent to 3.34c, delivered New York. Galvanized still can be had in some instances at 4.90c, base Pittsburgh, but the usual price is 5.00c. Black sheets are the easiest as to price, and can be bought without difficulty at 3.75c, base Pittsburgh.

Market Has Better Tone

Youngstown, O., Jan. 8.—A distinct improvement is evident in the sheet market. Makers are acquiring better backlogs and a majority of them are now quoting on tonnage which they cannot deliver until the second week in February. Rolling schedules were enlarged this week mills now operating at 66 per cent of capacity. This is the highest average since the third week in September, 1923. Better and stronger inquiries are apparent. The market still has a few weak spots in the price structure, such as 3.75c quotations on black and 4.90c on galvanized. Blue annealed has firmed up to the full price of 3.00c, and a slightly better demand is noted. One or two producers who recently met competitive prices of $2 a ton under the market on black and galvanized returned this week to their former position of 3.85c on black and 5.00c on galvanized. Demand for galavnized has broadened, as a number of mills have discontinued the manufacture of galvanized sheets, some producers believe prices will be sensitive to the slightest increase in demand. They are urging customers to get under contract. Since the first of this year a number of consumers of high grade sheets have issued releases against tonnage held up during the inventory period. Smaller consumers of high-grade stock are not heavy buyers in the market, but renewed activity is expected when production programs are completed. Full finished sheets are quoted at 5.35c, Pittsburgh.

Good Business Coming In

Chicago, Jan. 8.—Makers of steel sheets are not being swamped by the inrush of first quarter business, but the steady flow of medium size orders from miscellaneous sources is satisfying. Most makers are booked about 70 to 75 per cent of capacity for the first quarter of 1924. Prices are firm at 3.00c, Pittsburgh, for blue annealed, 3.85c for black and 5.00c for galvanized. The Inland Steel Co. is now directing all operations and sales of the Milwaukee Rolling Mill Co., which it has acquired as of Jan. 1.

Market Is Broadening

Philadelphia, Jan. 8.—Sheet demand is broadening and more buying for first quarter is noted. Blue annealed is firm at 3.00c, Pittsburgh; black is 3.75c to 3.85c and galvanized is 4.90c to 5.00c. Consumers' stock are low and prompt demand is good. Contracts are being taken right along by the mills. Only black sheets reflect any real weakness. It is easy to place attractive tonnages, either for nearby or first quarter shipment at 3.75c, Pittsburgh, equivalent to 4.07c, delivered Philadelphia.

Specify Strip Heavily

STRIP PRICES, PAGE 139

Pittsburgh, Jan. 8.—The trend toward better buying in steel products is becoming more manifest in hot and cold-rolled strip steel. Most makers in this territory are now well committed for first quarter at least, and have actual specifications for several weeks. Specifications in December were twice those of November and January promises to exceed the December rate. Automotive interests have awakened to the danger of delay and have been heavy buyers. A few large tonnages, 1000 to 2000 tons have resulted, with a large number of smaller orders. Prices are firm on the basis of 3.00c and 5.00c, Pittsburgh, for hot and cold-rolled strip steel, respectively.

The Gary Screw and Bolt Company Gary, Ind., has increased its capital from $1,000,000 to $2,000,000.

Shape Sales Are Heavier

Ford Motor Co. Buys Over 12,000 Tons for Extension in River Rouge—Other Large Buyers Enter Market as Building Continues Unabated

STRUCTURAL SHAPE PRICES, PAGE 139

New York, Jan. 8.—Structural activity is being well maintained, with prices on fabricated material still moving upward. On an apartment house job just placed, fabricated material went at $5 above that for a similar job a fortnight or so ago.

One of the largest single building projects launched in the metropolitan district lately is that of the Mandel building, Lexington avenue and Twenty-second street. Specifications are expected out on this in several weeks calling for 20,000 tons.

Awards Growing in Size

Pittsburgh, Jan. 8.—Structural shape awards since the first of the year have been more numerous and involve larger tonnages than those placed during the closing days of 1923. For instance, a 1400-ton lot for extension to the plant of Central Tube Co. was placed with Jones & Laughlin Steel Corp. A new forge and pressed steel plant for the Ford Motor Co. at River Rouge, Mich., which it is understood will involve 12,000 to 15,0000 tons, finally went to McClintic-Marshall Co. All fabricators report the mill price firm at 2.50c, base Pittsburgh, although their own prices for material fabricated and erected do not manifest much strength due to the keen competition which still exists.

Promised Projects Coming Out

Chicago, Jan. 8.—Some large structural tonnages are coming to the fore and while not sufficient time has elapsed to permit awards, fabricators are figuring on much business. Fabricators and business interests are confident that 1924 will see the 1923 record of construction in the Chicago district at least equaled. In 1923 building permits for $331,851,000 were issued in Chicago. The Santa Fe railroad has included a $5,000,000 bridge over the Mississippi river at Fort Madison in its 1924 budget. The plain material price continues 2.60c, Chicago.

Activity Confined to Small Lots

Cincinnati, Jan. 8.—Activity in the structural shape market in this district is confined largely to small tonnages with few jobs of any size being before fabricators. No action as yet has been taken on 3000 tons for the new Ford plant at Louisville, Ky., which has been pending for several weeks. The Stacey Mfg. Co. is working on several projects, involving sizable tonnages for gas tanks.

Heavy Inquiries Expected

Cleveland, Jan. 8.—Projects requiring heavier tonnages of structural shapes are expected to be brought into the market soon. Many small contracts are being placed and many jobs taking light tonnages are being figured. Railroad bridge work is expected to be unusually heavy during the first quarter and possibly the first half. The largest local award in the past few weeks was that of 600 tons for the Baldwin reservoir filtration system to T. H. Brooks Co. Prices continue firm at 2.50c, base Pittsburgh. An unidentified local project requiring 4000 tons is reported to have been placed before local fabricators. The Louisville & Nashville railroad contemplates purchasing 2800 tons for bridgework.

Heavy Program Planned

Boston, Jan. 8.—Nearly all structural steel fabricators in this district look for heavy construction work during the first half of this year. In Boston work in sight totals approximately 20,000 tons. Some of the larger jobs are still in an uncertain stage. The Statler hotel calling for 5000 tons is expected to be ready for figures the latter part of March. Other work in prospect includes two theaters, a bank building, and several office buildings. Prices remain firm at 2.40c, Pittsburgh. The smaller mills which quoted 2.35c early in December apparently are well booked and are not taking tonnage below the 2.40c level.

More Buying Being Done

Philadelphia, Jan. 8.—Plain shape demand is better with considerably more buying being done for current requirements to fill out stocks. The market continues at a 2.40c, to 2.50c, Pittsburgh, with anything under 2.40c being exceptional. Eastern mills are operating at from 50 to 75 per cent of capacity. Bids are expected to be asked in March or April on about 20,000 tons for the Delaware River bridge.

STRUCTURAL CONTRACTS PLACED

Building awards this week..... 43,333 tons
Building awards last week..... 11,520 tons
Building awards two weeks ago.... 47,400 tons

12,000 to 15,000 tons, forge shop and pressed steel plant for Ford Motor Co., Detroit, to McClintic-Marshall Co.

6100 tons, Ford Motor Co. plant at St. Paul, to Minneapolis Steel & Machinery Co. and St. Paul Foundry Co. as announced last week.

5000 tons, Pennsylvania bridges, Sunbury, Pa., to the Bethlehem Steel Co., as previously announced.

4000 tons, buildings for Ford Motor Co. at Charlotte, N. C., Memphis, Tenn., and Jacksonville, Fla., to Virginia Bridge & Iron Co.

3000 tons, James Madison high school, New York, to Jones & Laughlin Steel Corp.

2800 tons, Steinway building, New York, formal contract awarded to American Bridge Co.

2000 tons, bridge for Baltimore & Ohio railroad at Parkersburg, W. Va., to Fort Pitt Bridge Works.

1720 tons, Claybourne avenue landing, New Orleans, to Lukens Steel Co., as announced last week.

1700 tons, transmission towers, Public Service Co. of Northern Illinois, to Riter-Conley Co., as announced last week.

1700 tons, loft building, 1 West Forty-seventh street, New York, to George A. Just Co.

1400 tons, Magoba loft, 64-70 West Thirty-seventh street, New York, to George A. Just Co.

1400 tons, extension to plant of Central Tube Co., Economy, Pa., to Jones & Laughlin Steel Corp.

1200 tons, loft at West Thirty-fifth street, New York, to Hedden Iron Construction Co.

1150 tons, service station, Sixtieth street and West End avenue, New York, to Hinkle Iron Co.

1000 tons, Webster exchange, Southern California Telephone Co., Los Angeles, to Union Iron Works.

1000 tons, Tacoma hotel, Tacoma, Wash., to Poole & McGonigle.

900 tons, plant building for American Cellulose Co., Cumberland, Md., to Lehigh Structural Steel Co.

700 tons, addition to state capitol building, Charleston, W. Va., to independent fabricator.

700 tons, apartment at East Fiftieth street, New York, to Hedden Iron Construction Co.

700 tons, Gilbert loft building, Thirty-fifth street, New York, to Hedden Iron Construction Co.

600 tons, Horn & Hardart bakery, 600 West Fortieth street, New York, to Harris Structural Steel Co.

600 tons, superstructure for Baldwin reservoir filtration buildings, Cleveland, to T. H. Brooks Co.

500 tons, apartment at 51 East Seventy-second street, New York, to McClintic-Marshall Co.

500 tons, Southern railroad, to 300 tons for a shop extension at Summerset, Ky., unnamed builder, and 200 tons for bridge work, to McClintic-Marshall Co.

500 tons, plant addition in Montana for Anaconda Copper Mining Co., New York, to American Bridge Co.

500 tons, apartment at West Seventy-fourth street, New York, to Paterson Bridge Co.

500 tons, Turner apartment, Sixty-sixth street, New York, to Hedden Iron Construction Co.

475 tons, additions for Dells Paper & Pulp Co., Eau Claire, Wis., to Worden-Allen Co.

450 tons, ore bridge for Tonawanda Iron Corp., Tonawanda, N. Y., sublet by Mead-Morrison Co. to Milwaukee Bridge Co.

450 tons, garage, East Forty-second street, New York, to National Bridge Co.

416 tons, addition to Younkers building, Des Moines, Iowa, to Pittsburgh-Des Moines Steel Co.

400 tons, apartments, 121 East Sixtieth street, New York, to Harris Structural Steel Co.

400 tons, Crocker Estate building, Market street, San Francisco, to California Steel Co.

400 tons, telephone building, Yonkers, N. Y., to Hedden Iron Construction Co.

375 tons, Elks clubhouse, Milwaukee, to Lakeside Bridge & Steel Co.

362 tons, hotel, Sutter and Leavenworth streets, San Francisco, to Schrader Iron Works.

335 tons, Telephone Exchange building, Bush and Franklin streets, San Francisco, to Golden Gate Iron Works.

300 tons, apartment 72 West Sixty-eighth street, New York, to Harris Structural Steel Co.

300 tons, theater, Long Island City, N. Y., to George A. Just Co.

300 tons, apartment at East Thirty-seventh street, New York, to Paterson Bridge Co.

300 tons, bridge for Pennsylvania railroad, near Rochester, N. Y., reported awarded to American Bridge Co.

250 tons, Armstrong training school, Washington, D. C., to McClintic-Marshall Co.

250 tons, three bridges for Lehigh Valley railroad, to unnamed fabricator.

250 tons, state hospital at Middletown, N. Y., to Kellogg Structural Steel Co.

250 tons, dock shed, Los Angeles, to Minneapolis Steel & Machinery Co.

250 tons, 200-foot bridge for Alaska Engineering Co., Alaska, to Independent Bridge Co.

250 tons, power plant extension for United Gas Improvement Co., Barbadoes island, Norristown, Pa., to Shoemaker Bridge Co.

225 tons, Koppers Co. for material to be used at plant of Utica Gas & Electric Co., Utica, N. Y., to Independent Bridge Co.

200 tons, factory for American Kardex Co., Tonawanda, N. Y., to Fort Pitt Bridge Works.

200 tons, bridge for Norfolk & Western railroads, to American Bridge Co.

200 tons, addition to plant of National Biscuit Co., Cleveland, to American Bridge Co.

183 tons, bridge for Woodbury county, Iowa, to Des Moines Steel Co.

154 tons, high school, South Bend, Ind., to unnamed fabricator.

150 tons, addition to Eastern Rolling Mill Co., Baltimore, to Belmont Iron Works.

140 tons, building for Rapid Transit Land Co., Cleveland, to T. H. Brooks Co.

135 tons, Richardson county court house, Falls City, Nebr., to Omaha Steel Works.

125 tons, plant addition for Philadelphia Coppersmithing Co., Philadelphia, to Montgomery Iron & Steel Co.

120 tons, addition to Camden Forge Co., Camden, N. J., to Belmont Iron Works.

119 tons, high school building, Sioux City, Iowa, to Paxton-Vierling Co., Omaha, Nebr.

107 tons, Bethany Girls' Home, Chicago, to American Bridge Co.

106 tons, Philadelphia & Reading bridge at

Boyertown, Pa., to Shoemaker Bridge Co.
106 tons, court house for Sedalia county, Iowa, to Des Moines Steel Co.
100 tons, additional for Stanley Flagg, Pottstown, Pa., to Phoenix Bridge & Iron Works.
100 tons, additions to St. Clair Sales Co. building and Allegheny County courthouse, Pittsburgh, to W. N. Kratzer Co.
100 tons, school, Flushing, Long Island, to George A. Just Co.
100 tons, building for Morgantown Post, Morgantown, W. Va., to McClintic-Marshall Co.

STRUCTURAL CONTRACTS PENDING

20,000 tons, Mandel building, Lexington avenue and Twenty-second street, New York; specifications expected in several weeks.
10,000 tons, municipal central repair shop, New York; pending.
5000 tons, train sheds for new Union station, Chicago; bids being taken.
4000 tons, Harriman Bank building, New York; bids in.
3000 tons, office building for S. S. Roth & Sons, 130 West Forty-second street, New York; bids asked.
3000 tons, Museum of History building, Los Angeles; bids being received.
2700 tons, schools Nos. 201, 80 and 109, Brooklyn, each involving 900 tons; bids out.
2100 tons, loft for Levy Bros., Eighth avenue and West Thirty-eighth street, New York; pending.
2000 tons, Bellevue hospital addition, New York City, previously reported as 1000 tons; bids closed.
1800 tons, north side theater, Balaban & Katz, Chicago; pending.
1500 tons, club hotel, West Palm Beach, Fla.; bids asked.
1000 tons, two school houses, Chicago; bids being taken.
1000 tons, apartment at 1040 Park avenue, New York; pending.
1000 tons, apartment, Seventy-fifth street and Broadway, New York; Schwartz & Gross, architect.
1000 tons, Lewis Graham apartment, Eighty-fourth street and Broadway, New York; Schwartz & Gross, architect.
800 tons, equipment sheds for state of Pennsylvania; bids asked.
700 tons, additional Baltimore & Ohio bridges; bids asked.
700 tons, apartment at 45 West Twenty-ninth street, New York; pending.
600 tons, Union Land & Building Co. office, Youngstown, O.; pending.
600 tons, apartment at Nineteenth street and West End avenue, New York; Schwartz & Gross, architect.
500 tons, junior-senior high school, Clairton, Pa.; bids close Jan. 18.
450 tons, bridge for Baltimore & Ohio at Allentown, Pa.; pending.
400 tons, Pensacola theater, Pensacola, Fla.; pending.
400 tons, museum of art, Toledo, O.; pending.
400 tons, Roth building, 202 West Thirty-sixth street, New York; pending.
400 tons, bridge for Central railroad of New Jersey; bids asked.
400 tons, branch for Italian Savings bank at Spring and Lafayette streets, New York; pending.
400 tons, branch form Italian Savings bank at East Sixtieth street, New York; pending.
350 tons, Crocker Estate building, Market street, San Francisco; bids being received.
300 tons, pier shed, Tampa, Fla.; bids asked.
250 tons, seven spans and three towers for Burlington railroad; bids in.
250 tons, Cosmopolitan studio, East 127th street and Second avenue, New York; pending.
250 tons, administration building for Peddie institute, Hightstown, N. J.; pending.
250 tons, apartment at 235 East Ninety-third street, New York; pending.
225 tons, double deck ferry landing, New Orleans, for New Orleans port commissioners; bids in.
300 tons, turbine room floor, Crawford avenue station, Commonwealth Edison Co., Chicago; bids in.
200 tons, bridge for New York, New Haven & Hartford railroad; pending.
200 tons, bridge for New York Central; bids asked.
200 tons, bridges for New York Central; Palmer Steel Co. reported low bidder on half and Bethlehem Steel Co. low on remainder.
169 tons, Bell Telephone Co. exchanges at Cynwyd, Pa., 122 tons, and Reading, Pa., 47 tons; pending.
150 tons, building at Westchester avenue, New York; Victor Mayper, engineer.
150 tons, warehouse and garage, Yonkers, N. Y.; pending.
150 tons, span for Union Pacific railroad; bids in Jan. 10.
120 tons, two buildings for Philadelphia Electric Co.; pending.

Car Orders Increase

Railroads Award More Contracts for 1924 Equipment—Track Accessory Buying Still Heavy—December Cars Placed Largest Since March

RAILROAD TRACK MATERIAL PRICES, PAGE 139

New York, Jan. 8.—Fresh car inquiry is featured by a list of 3000 steel box car bodies for the Pennsylvania railroad and 1000 refrigerator cars for the Western Fruit Express. The New York Central is preparing specifications on 10,000 cars, but will probably not be in a position to issue the inquiry for this equipment for at least 30 days. Orders the past few days have been light.

With total sales involving 10,600 freight cars, December was the most active month since March, when 42,499 cars were placed, and the third best month of the year.

The Imperial Railways of Japan placed 10,000 tons of rails with the United States Steel Products Co., the rails to be rolled by the Tennessee Coal, Iron & Railroad Co. The Tennessee company also has booked 9000 tons of rails and 3000 tons of accessories for the International & Great Northern railroad.

The Pennsylvania Railroad Co., now has under negotiation a large inquiry for track spikes and track bolts. The Glen Alden Coal Co., Scranton, Pa., has placed 2000 tons of light rails for delivery over the first quarter.

Regular Contracts Placed

Boston, Jan. 8.—Regular contracts for 1924 rails in New England have been entered and additional sales will be mostly of a spot character. Sales to steam roads of New England, totaled 53,000 tons. A contract for 50,000 tie plates was closed during the past week.

Resale Rails Being Offered

Pittsburgh, Jan. 8.—Occasionally a small billet-rolled light rail order is placed at the 2.25c, base Pittsburgh, level for 45-pound sections, that figure being maintained by two or three large producers. In addition to the competition from rerollers which now is particularly keen since prices as low as 1.75c to 1.85c are current, some resale billet-rolled rails have come into the market offered by a large coal company at $30 per ton, or 1.50c, base Pittsburgh. On some large tonnages of standard spikes 3.05c, base Pittsburgh, was done. The general market remains quotable at 3.15c. Some small spikes went at 3.40c. The American Steel & Wire Co.'s figure of 3.25c on its barbed small spikes is not met in a competitive way. The 3.50c figure applies on boat and barge spikes. Tie plates are firming up on the basis of 2.60, Pittsburgh, and standard track bolts are quotably unchanged at 400c, base Pittsburgh

Roads Anxious for Material

Chicago, Jan. 8.—Railroads are evidencing an unusually hearty appetite for the rails and track fastenings they have ordered from Chicago mills for 1924 delivery. The pressure for deliveries has eased but mills are rolling to capacity.

One railroad is inquiring for 10,000 tons of tie plates. Individual placements include 5000 tons of angle bars, 6000 tons of tie plates, 15,000 kegs of spikes and 12,000 kegs of spikes, bolts and nuts. The Southern Pacific's award of 3057 refrigerator cars is looked for daily.

Railroad budgets for 1924 are prophetic of heavy buying. The Santa Fe budget includes $22,000,000 for equipment and $6,000,000 for second track. The St. Louis & San Francisco will spend $6,000,000 in 1924, mostly for equipment.

CAR ORDERS PLACED

New York Central, conversion 2000 cars as follows: 500 gondolas to flat cars to Pennsylvania Tank Car Co.; 500 gondolas to flat cars, to Youngstown Steel Car Co., 400 box cars to stock cars to the Standard Tank Car Co., and 600 flat cars to box cars, to Ryan Car Co.
St. Louis & Southwestern, 1000 box cars, divided equally between American Car & Foundry Co. and Mt. Vernon Car & Mfg. Co. as previously reported.
Chicago & Alton, 250 box cars, to Pullman Co.
Philadelphia & Reading, 20 cabooses, to own shops.
Interboro Rapid Transit Co., New York, 100 subway cars, to American Car & Foundry Co.
Alabama & Vicksburg, eight coaches, to American Car & Foundry Co.
Lehigh Valley, 25 milk cars, to American Car & Foundry Co.
Southern Pacific, 6555 cars as follows: 2975 box cars, to Standard Steel Car Co.; 450 flat cars, 250 stock cars and 500 gondolas, to Ralston Steel Car Co.; 205 gondolas and 600 general service cars, to General American Car Co.; 500 automobile cars to Pullman Co., and 500 flat cars, 500 logging cars and 75 cabooses, to own shops. Previously reported in Jan. 3 issue IRON TRADE REVIEW.
Western Pacific, 200 automobile cars, to Standard Tank Car Co.
Interstate Public Service Corp., Indianapolis, 10 stock cars and five coaches, to American Car & Foundry Co.
Baltimore & Ohio, 55 coaches, reported awarded to Pullman Co.
Chesapeake & Ohio, 25 steel caboose underframes, to Illinois Car Co.
Pennsylvania railroad, 3000 steel automobile box cars; pending.

CAR ORDERS PENDING

Lehigh & Hudson River, 10 refrigerator cars; pending.
Central of Georgia has increased its inquiry for coaches to include 15; pending.
Western Fruit Express, 1000 refrigerator cars; pending as previously reported.
American Steel & Wire Co., 20 gondolas; pending.
Northern Pacific, 200 ore cars; pending.
Swift Car Lines, 300 refrigerator car underframes; pending.
Anglo-Mexican Petroleum Co., 28 tank cars; pending.
New York Central, 500 box cars for Rutland railroad; pending.
Philadelphia & Reading, 1000 steel gondolas; inquiry withdrawn because of high prices. Understood 2.35c, Pittsburgh, was quoted as announced in Jan. 3 issue of IRON TRADE REVIEW.
Western Pacific, 200 ore cars; pending.
Big Four railroad, conversion of 200 to 700 box cars to stock cars; pending.
Western Pacific railroad, 775 refrigerator cars; bids in.
Seaboard Air Line, repairs to 299 phosphate cars; pending.
Southern Pacific, inquiring for 15 diners, 23 baggage cars, 6 baggage-horse cars and 6 buffet-baggage cars; pending.
New York Central, 10,000 freight cars; specifications being prepared, but will not be up for estimates for at least 30 days.
Philadelphia & Reading, 15 to 25 cabooses, to own shops.
Chesapeake & Ohio, repairs to 1500 coal cars; pending.
Northern Pacific, 1000 center construction; pending.

The Nonferrous Metals

Lead Continues Up and Zinc Is Stronger but Copper and Aluminum Change Little—Trade Generally Slow

	Copper—Electro delivered	Copper—Lake delivered	Spot Straits New York	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Jan. 2.....	13.00	13.25	47.12½	8.15	6.27½	26.50	10.00	29.00
Jan. 3.....	13.00	13.25	47.37½	8.25	6.30	26.50	10.00	29.00
Jan. 4.....	12.87½	13.12½	47.12½	8.25	6.32½	26.50	10.00	29.00
Jan. 7.....	12.87½	13.12½	47.50	8.25	6.35	26.50	10.00	29.00
Jan. 8.....	12.87½	13.12½	48.00	8.25	6.40	26.50	10.00	29.00

†Outside market quotation.

NEW YORK, Jan. 8.—New business in metal was light the first week of the year, as consumers have been busy with inventories and laying out 1924 policies.

Lead has been a market by itself, with a large aggregate buying at rising prices. Pig lead has sold up to 8c to 8.10c, East St. Louis, 8.25c, New York, in the outside market for January-February shipments. The American Smelting & Refining Co. advanced its contract price from 7.50c to 7.75c, New York, Jan. 2. This price, however, is not representative of the market for new business. The continued heavy consumption of lead, here and abroad, with the curtailment of supplies in this country due to specific causes such as the Hecla mine fire, apparently sufficed to overbalance the scales on the side of demand.

Copper has shown an easy tendency. A factor in the market has been the decision of the Guggenheim interests, American Smelting & Refining Co. and the Phelps Dodge Corp. to withdraw from the Copper Export association, which is expected to cause increased competition abroad. Electrolytic copper prices sagged to 12.87½c, delivered, for first quarter; casting, 12.62½c; lake, 13.12½c. No changes were made in brass and copper products base prices.

Due to a rise in zinc ore prices to $43 in Joplin and to a rising London market, zinc prices have advanced ⅛ cent since the new year opened. Sales have been made at 6.40c, East St. Louis. Sheet zinc base price was advanced ¼ cent to 9.50c, base.

Tin prices have ranged between 46.50c and 48.00c, for Straits, with sharp premiums quoted for spot, due to small early January arrivals. World visible supplies increased 1491 tons in December, owing to heavy Straits shipments and relatively small American deliveries.

Antimony prices have held at 10c, duty paid, for spot, with practically no current offers of future shipments.

Aluminum has been extremely scarce in the outside market. The regular importers have little or no metal to sell and resale lots are held at high premiums above the domestic producer's price. Sales of 99 per cent have been made in carlots at 28.75c; 98 to 99 per cent may be quoted 26.50c to 27c in the outside market.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 4 oz., min..	21.00
High brass	17.75
Zinc, ga. 9 to 18 (plates ½c less)	9.50
Lead, full sheets (cut ¼c more)	10.75
Aluminum, base 18 ga. and up..	36.40
SEAMLESS TUBES	
High brass	22.00
Copper	23.50
RODS	
High brass, round, ⅜ to 2½-inch	15.50
Naval brass rods.....	18.25
WIRE	
Copper .....15.50 to 15.87½	
High brass	18.25

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.25 to 9.50
New York	8.50 to 9.00
Chicago	9.00
HEAVY YELLOW BRASS	
New York	5.50 to 6.00
Chicago	6.75 to 7.00
Cleveland	6.75
ZINC	
New York	4.25 to 4.50
Cleveland	3.75
Chicago, dross	4.00
HEAVY COPPER AND WIRE	
Cleveland	10.50 to 10.75
New York	10.50
Chicago	10.75
RED BRASS TURNINGS	
New York	7.50 to 8.00
Cleveland	8.50 to 8.75
Chicago	8.50
YELLOW BRASS TUBING	
Cleveland	6.00 to 6.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.25 to 6.50
New York	6.00 to 6.50
Chicago	6.75
ALUMINUM BORINGS	
Cleveland	11.00 to 12.00

Light Demand

For Benzol Faces Concessions—Sulphate of Ammonia Firm

New York, Jan. 8.—With a strong market in motor fuel and relatively easy prices in industrial benzol, a somewhat paradoxical situation exists in coal tar by-products. The larger sellers of distillates who are going in for motor fuel business heavily, find difficulty in meeting demand and therefore have little industrial benzol available; the majority of the smaller interests, however, who are not in a position to furnish a steady supply of motor fuel, and consequently are not figuring to any extent on business of this character, are forced to put much of their production into benzol, and with the industrial demand light for this product, are compelled to make concessions.

In some instances, prices on 90 per cent benzol have been as low as those done on motor fuel. One large consumer recently was able to contract for a substantial quantity at 18 cents delivered, or close to 16 cents works. However, as a heavy quantity was involved, the price made was under that regarded as the going market, which is still around 18 to 20 cents in tanks and 26 cents in drums. The market on pure benzol is 19 to 22 cents works in tanks and 27 cents in drums. Toluol may be quoted at 23 to 24 cents in tanks, 29 cents in drums; solvent naphtha, at 23 to 24 cents in tanks and 29 cents in drums; commercial xylol 27 to 29 cents in tanks and 34 cents in drums.

The firmer tendency noted recently in sulphate of ammonia continues in evidence. Domestic demand continues light, with the market quoted nominally at $2.70 to $2.75 works. The export market is unchanged at $2.65 to $2.70 port, for material in double bags.

Phenol is unchanged at 27 cents works in large lots and 30 cents in small lots. Steadiness also is noted in naphthalene, which still is quoting at 8½ cents works for balls and 9½ cents for flakes.

Coke Oven By-Products

Spot*

Per Gallon at Producers' Plants in Tank Lots	
Pure benzol	$0.19 to 0.22
Toluol	0.23 to 0.24
Solvent naphtha	0.23 to 0.24
Commercial xylol	0.27 to 0.28
Per Pound at Producers' Plants	
Phenol	0.27
Naphthalene flake	0.08½
Naphthalene balls	0.09½
Per 100 Pounds at Producers' Plants	
Sulphate of ammonia.....	$2.70 to $2.75
Contract	
Pure benzol	$0.22
Toluol	0.24
Solvent naphtha	0.24
Commercial xylol	0.28
Per Pound at Producers' Plants	
Phenol	$0.27
Naphthalene flake	0.08½
Naphthalene balls	0.09½

*Spot distillates are subject to shading.

Foreign Spar Selling

New York, Jan. 8.—Foreign fluorspar continues to be sold at around $15 to $15.50 per gross ton, c.i.f. tidewater, which is equivalent to $20.60 to $21.10 duty paid. Most of the foreign material is from England, as English shipments more readily guarantee the 85 and 5 per cent grade. Some Italian and German fluorspar also is being sold.

Spar Orders Are Taken

Pittsburgh, Jan. 8.—While generally at this season of the year the fluorspar market is inactive and one interest here reports that the commodity has not even been mentioned in its office for about three weeks, another seller has disposed of two lots totaling 350 tons. One nearby consumer bought 300 tons at $19.75 f.o.b. Kentucky mines and another interest purchased 50 tons at the same figure. No inquiries now are out.

Awarded Forging Contract

Cincinnati, Jan. 8.—The American Car & Foundry Co., Huntington W. Va., has been awarded the contract for 600 tons of forgings to be used by the United States government in the construction of Dams No. 44 and 45 on the Ohio river.

Activity in Northwest

Every Business Indication Is for Larger Total Than in Past—Building Construction Outlined for Early Completion

SEATTLE, Jan. 2.—The new year finds the Pacific Northwest standing on a fundamentally sound business foundation. Business and industry have enjoyed a better year than was expected and the future shows every indication of increased prosperity. Building continues active. Within a few days three permits totaling more than $2,000,000 will be issued in Seattle. These include a $1,000,000 office structure, a $600,000 water terminal and a half-million dollar apartment house. Seattle's building permits in 1923 established a new record of $23,000,000, a gain of more than $3,000,000 over 1922.

Last year western Washington mills broke all previous records by producing 6,250,000,000 feet of lumber valued at $165,620,000, a gain over 1922 of 546,341,000 feet, valued at $35,000,000. Seattle bank clearings totaled $2,000,000,000 last year, a gain of $200,000,000 over 1922. Postoffice receipts, the movement of water and rail freight and every other business barometer made substantial gains in 1923.

Tacoma closed the year with a building total of $5,400,000 greater than any previous year. New work already in sight in that city totals $4,600,000 and 1924's record is expected to be $9,000,000.

New highway projects planned by the state highway department include the construction of 51 miles of concrete pavement and bridges at an estimated cost of $6,470,000. Stone & Webster interests have filed application for a $600,000 hydroelectric power plant on the Sultan river, Snohomish county, a unit of the company's state development plan. Government officials have recommended the erection of a $1,000,000 marine hospital at Seattle.

Pig Iron and Coke

The market is rather quiet. Consumers are fairly well covered for first quarter by purchases made in November and December. Only English and Scotch iron can compete in this territory. Prices remain unchanged with spot delivery commanding about $1 premium over futures. Importers have sufficient stocks to supply current orders. It is expected that buying for second quarter delivery will begin soon as stocks are not large and additional importations will be required to carry consumers into the summer.

There is little interest in coke although one local importing firm is bringing in 500 tons of high grade British coke for February delivery. This was ordered for some special foundry work. British coke was purchased because it was lower than Atlantic Coast grades.

Bars, Plates and Shapes

With construction active there is a sustained demand for steel bars. The local mill reports increased interest in bars since the holidays and prospects for active business are promising. Some inquiry has recently come from the Orient for steel bars but Coast producers seem unable to meet prices of foreign competitors. According to reports, Japanese are supplying part of the demand from Japanese mills. Plates and shapes are moving in fair volume, the former especially being in demand. Reinforcing steel, about 600 tons, for a Tacoma hotel, will be furnished by the Pacific Coast Steel Co. which has also been awarded a number of smaller contracts. The structural steel work on the Tacoma hotel, amounting to approximately 1000 tons, went to Poole & McGonigle of Portland.

Other Finished Materials

Wholesale jobbers have completed inventory and are looking for an active year. In 1923 the jobbing trade was excellent. December was much better than expected. During the holidays there was a large turnover in plates, tubes, sheets and rivets for repairs at logging and lumber plants. With stocks low, jobbers have ordered supplies which are to arrive shortly as there is every indication of a busy spring. Prices are unchanged, adjustments last month evidently having stabilized conditions at all Coast centers.

Old Materials Are Dull

The scrap market remains lifeless. Prices are about the same, with steel scrap weak at $10 to $10.50 per gross ton and cast iron being quoted at $17 to $18, according to grade. Cast iron is in poor demand the volume of sales being negligible. The local steel mill is practically the only purchaser of steel scrap at present. The demand from the Orient is limited, although one exporting house is reported to be assembling between 500 and 1,000 tons for shipment to China.

Larger Demand Expected

Washington, Jan. 8.—The iron and steel division of the department of commerce says in a bulletin that prospects for an increase in world demand during 1924 are good. It is expected that American producers of iron and steel will supply a larger share of foreign requirements than they did in 1923.

Build New Tube Mills

Youngstown, O., Jan. 7.—An additional stove for Jeannette stack at the Brier Hill works of the Youngstown Sheet & Tube Co. has been authorized. The cost will be about $100,000.

No. 1 lap weld pipe mill at the Indiana Harbor plant of the Youngstown Sheet & Tube Co. is being dismantled to be re-erected in a new building now in course of construction. Two new butt weld pipe mills will be built in place of this mill. Contracts for reconstruction and some of the machinery have been let.

Orders Heavier

For Fire Clay and Silica Refractories —Prices are Unchanged

Pittsburgh, Jan. 8.—Orders are increasing for fire clay and silica refractories, numerous steel companies looking to their first quarter and even first half requirements. Some already have specified against their formal contracts placed and several orders of 1,000,000 to 3,000,000 brick each were recorded in the past several days. The McKinney Steel Co. has placed an order for about 1,250,000 silica and 750,000 fire clay brick; the Youngstown Sheet & Tube Co. placed an order for 2,000,000 fire clay brick for a blast furnace stove lining and the Wheeling Steel Corp. distributed orders for about 3,000,000 silica brick. This last interest likewise inquired for a large quantity of fire clay brick but is understood to have decided to purchase this grade as needed.

Numerous other orders for these and other consumers for spot needs of 50,000 to 200,000 brick likewise have been recorded. Prices for machine pressed fire clay brick still hover around the $42 level but hand-made brick command $45. In silica some large orders have been taken on a competitive basis at $40 but the regular market still is $42, and less is heard about price cuts below the $40 level. A fairly heavy ordering rate has been enjoyed by the makers of chrome brick. Some requirement contracts still are being taken at $45 although on smaller orders for partial requirements as much as $48 still is being paid. In magnesite, single carloads still carry the $65 price but on larger orders price concessions, usually of $2 per ton, are made.

Refractories

FIRE CLAY BRICK
(Per 1000 f.o.b. works)

Pennsylvania, No. 1	$42.00 to 45.00
Pennsylvania, No. 2	35.00 to 38.00
Ohio, No. 1	42.00 to 45.00
Ohio, No. 2	35.00 to 38.00
Illinois, No. 1	45.00 to 48.00
Illinois, No. 2	42.00 to 44.00
Kentucky, No. 1	42.00 to 44.00
Kentucky, No. 2	37.00 to 39.00
Missouri, No. 1	38.00 to 40.00
Missouri, high grade	48.00 to 50.00
Maryland, No. 1	44.00 to 51.00
Maryland, No. 2	40.00 to 42.00

SILICA BRICK

Pennsylvania	40.00 to 42.00
Chicago	49.00
Birmingham	50.00

MAGNESITE BRICK
(Per Net Ton Seaboard Base)

9 x 4½ x 2½	$63.00 to 65.00

CHROME BRICK
(Per Net Ton)

9 x 4½ x 2½	$45.00 to 48.00

Steel Ingots

Total 43,226,955 Gross Tons in 1923—Second Highest on Record

Steel ingot production in 1923 totaled 43,226,955 gross tons, according to statistics compiled by the American Iron and Steel institute from figures supplied by companies which in 1922 produced 95.35 per cent of the total for the country. The output for December was 2,843,764 tons, a decrease of 270,040 tons from the 3,113,804 tons of November. With December, operations have declined for eight consecutive months. December had 25 working days as compared with 26 during the preceding month. Actual production of the reporting companies was 2,711,529 tons as against 2,969,012 tons in November, the loss being 257,483 tons.

On an average daily basis production of the country in December was 113,750 tons, a drop from the 119,762 tons per day in November of 6012 tons, or 5 per cent. The decline of November over October was 8.8 per cent. Since the high point of 157,776 tons per day was produced in April, production has declined about 44,026 tons or 25.5 per cent. On the basis of 113,750 tons per day in December and 310 working days in the year, the indicated annual rate of production during the month was 35,262,500 tons, this being 1,863,720 tons less than the November rate of 37,126,220 tons per year. In April production was at the high rate of 48,910,560 tons per year.

The total production of 43,226,955 tons for 1923 was a gain of 8,658,537 tons over the 34,568,418 tons of 1922. As a matter of fact, the 1923 output was second only to that of 1917 when the production was 43,619,200 tons, the difference being only 392,245 tons. The average daily rate of ingot production for 1923 was 138,993 tons, a gain of 27,482 tons per day over the daily rate of 111,511 tons for 1922.

Comparisons of steel ingot production by months for 1922 and 1923, as compiled by the American Iron and Steel institute show in the accompanying table.

Index Is Ready

THE index to Volume LXXIII of IRON TRADE REVIEW, *covering the last six months of 1923, now is ready for distribution. Copies will be sent to all subscribers desiring them.*

Lost Ship Carried Ore

The United States shipping board steamer CONEJOS which recently was reported lost in the Black Sea with all hands, for the past six months had been engaged principally in transporting Caucasian manganese ore to the United States for the Iron & Ore Corp. of America, 11 Broadway, New York. On her last trip she left Poti with 5000 tons of manganese ore for Baltimore. The ore was for subsidiaries of the United States Steel Corp.

Steel Ingot Production 1922-23

1922	Open-hearth	Bessemer	All other	Monthly production	Calculated monthly production all companies	No. of working days	Approximate daily production all companies	Change, per cent daily production
				84.15 per cent of industry reporting				
Jan.	1,260,809	331,851	822	1,593,482	1,891,857	26	72,764	
Feb.	1,395,835	348,571	616	1,745,022	2,071,772	24	86,324	+18.6
March	1,918,570	451,386	795	2,370,751	2,814,667	27	104,247	+20.8
April	1,997,465	445,939	1,109	2,444,513	2,902,240	25	116,090	+11.2
May	2,214,774	494,893	1,474	2,711,141	3,218,794	27	119,215	+ 2.8
June	2,143,708	487,851	2,918	2,634,477	3,127,775	26	120,299	+ 0.8
Total 6 mos.	10,931,161	2,560,491	7,734	13,499,386	16,027,105	155	618,939	
July	2,020,572	464,047	2,485	2,487,104	2,952,806	25	118,121	— 1.7
Aug.	1,807,310	404,379	2,893	2,214,582	2,629,256	27	97,380	—17.7
Sept.	1,911,147	460,127	2,505	2,373,779	2,818,261	26	108,395	+11.3
Oct.	2,352,207	518,010	2,198	2,872,415	3,410,265	26	131,164	+21.0
Nov.	2,360,903	525,945	2,449	2,889,297	3,430,309	26	131,935	+ 0.5
Dec.	2,241 104	536,214	2,572	2,779,890	3,300,416	25	132.017	+ 0.1
Total 12 mos.	23,624,404	5,469,213	22,836	29,116,453	34,568,418	310	111,511	
1923				95.35 per cent of industry reporting				
Jan.	2,906,892	728,270	9,467	3,644,629	3,822,369	27	141,569	+ 7.1
Feb.	2,613,564	669,903	10,797	3,294,264	3,454,918	24	143,955	+ 1.7
March	3,046,309	799,525	12,841	3,858,675	4,046,854	27	149,883	+ 4.1
April	2,974,579	772,485	13,933	3,760,997	3,994,412	25	157,776	+ 5.2
May	3,136,558	847,418	16,719	4,000,695	4,195,800	27	155,400	— 1.5
June	2,821,239	737,845	15,483	3,574,567	3,748,890	26	144,188	— 7.1
Total 6 mos.	17.499,141	4,555,446	79,240	22,133,827	23,213.234	156	148,803	
July	2,658,449	680,884	11,496	3,350,829	3,514,241	25	140,570	— 2.5
Aug.	2,796,370	701,059	9,326	3,506,755	3,677,771	27	136.214	— 3.1
Sept.	2,539,653	613,709	8,602	3.161,964	3,316,166	25	132.647	— 2.5
Oct.	2,724,371	649,452	9,163	3,382,986	3,547,966	27	131,406	— 0.9
Nov.	2,343,378	616,335	9,309	2,969,012	3,113,804	26	119.762	— 8 8
Dec.	2.130,613	570,004	10,912	2.711,529	2,843,764	25	113,750	— 5.0
Total 11 mos.	32,691,965	8,386,889	138,048	41,216,902	43,226,955	311	138,993	

Ford Plant Extensions to Cost $110,000,000

Detroit, Jan. 8.—An expenditure of $110,000,000 to $115,000,000, the Ford Motor Co., announces will be required in 1924 for completion of work begun in 1923 and for new projects.

The Highland Park, Mich., plant will be enlarged and a portion of the plant will manufacture bodies. Railroad facilities at the plant will be improved. A portion of machinery used at Highland Park has been transferred to River Rouge and Iron Mountain, Mich. This was done to make room for the improvements. The principal new work to be done in 1924 follows:

Completion of a new body factory and wood distillation plant at Iron Mountain.

Completion of coke ovens at River Rouge, in which coke and its by-products will be manufactured by low temperature process.

Completion of cement plant at River Rouge, where 1000 barrels of cement daily will be made from blast furnace slag.

Completion of engineering laboratory at Dearborn, Mich.

Increased production at company's plant at Flat Rock, Mich., for manufacture of about 1400 automobile lamps daily.

Extensive development of waterways in Green Island, N. Y. district, looking toward an all-water route from Detroit to seaboard.

At Iron Mountain the company is erecting a large dam in preparation for a hydroelectric plant on the Menominee river which will have a capacity for generating 9000 horsepower. The company is enlarging its dry-kiln facilities to have a daily drying capacity of 300,000 board feet.

Construction will begin soon on the new assembly plant at Philadelphia, and about Feb. 1 production will begin at the new Hegewich, Ill., plant.

During the year three new steel bulk freighters are expected to be delivered to the company from the Great Lakes Shipbuilding Co. These will be used to carry iron ore.

Cast Iron Pipe Buying Drops in November

Washington, Jan. 8.—Sales, production and shipment of cast iron pipe in November recorded lower totals than October but were at a higher level than September, according to figures issued by the department of commerce. The following comparative figures include returns from 12 establishments and are confined to bell and spigot pressure pipe exclusively.

	Produced tons	Shipped tons	Orders from stock tons	Orders from specifications tons
June	81,208	88,318	17,905	199,271
July	79,528	77,828	16,839	183,130
August	84,588	84,843	14,727	165,518
September	77,186	78,101	14,215	156,585
October	88,696	88,000	17,431	119,947
November	80,945	73,080	18,238	118,995

Head of Steel Corporation Fleet Retires

Harry Coulby Resigns After Nineteen Years as President of Pittsburgh Steamship Co.—Faced Big War Problem Successfully

BY R. V. SAWHILL
Editor Marine Review

HARRY COULBY has given up voluntarily a position of commanding importance in American business. He has resigned as president of the Pittsburgh Steamship Co., the freight carrying subsidiary of the United States Steel Corp. on the Great Lakes. In that capacity he has been directing the fortunes of the two largest fleets on the lakes, carrying about two out of every five tons of iron ore brought down the waterways from the Lake Superior ranges. Practically, he has been placing in the furnace yard ready for charging, one-third of the iron ore used by the American steel industry. The name of Harry Coulby for 30 years has been symbolic of efficient transportation by water. He succeeded A. B. Wolvin as head of the Pittsburgh company in 1904 but before that time he had been active in running the fleet of Pickands, Mather & Co. He combined these two positions for the last 19 years, and now is resigning his Pittsburgh Steamship work to give his full time to the fleet of Pickands, Mather & Co., known as the Interlake Steamship Co. Mr. Coulby will act as chairman of the Pittsburgh company. He is 59 years old. His position as chief of the two biggest fleets naturally won him priority among lake transportation men. But beyond that fact, he acquired a dominant influence through force of character and a native ability to plan wisely.

The war gave Mr. Coulby an opportunity for proving his caliber. Nearly 10 years earlier, union restrictions on lake vessels had become intolerable to the vessel owners. From 1908 on, the latter had operated on the open shop basis with steadily mounting success. When the war brought with it the decision to place first one industry and then another under governmental control the unions tried to have the shipping board assume supervision of lake transportation.

Mr. Coulby led the committee which went to Washington to head off this movement. He won a temporary respite from federal control, provided the lake men would meet the full demands of the iron ore, coal and grain trades—the three most essential to winning the war. Back in Cleveland, Mr. Coulby took the chairmanship of a mobilization committee which functioned through and for a time after the war. Under this centralized control and despite railroad congestion, the lake fleets without any increase in capacity, moved more than 60,000,000 tons of iron ore as against a prewar record of only 49,000,000 tons. The 1918 coal movement was a record. In the face of such performances the movement to put the lake ships under national control fell apart. As head of the Pickands, Mather & Co. fleet, Mr. Coulby will direct 51 ships of 414,400 gross tons capacity per trip. The Pittsburgh fleet has 99 ships and 808,400 tons capacity per trip. Mr. Coulby has been a member of the firm of Pickands, Mather & Co. for years. A. F. Harvey, vice president and assistant general manager, becomes head of the Pittsburgh company.

Belgians Set Low Price Pace

Offers Extend to United States, With $25, Boston, Named on 3 Per Cent Silicon Iron—Ruhr Selling Steel to South America, Though Strikes Delay Production—85,000 Tons London Tunnel Segments Placed

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, Jan. 8.—Belgian interests are negotiating for the sale to American consumers of 2000 tons of foundry iron (3 per cent silicon) at $25, Boston. The continental producers are setting the pace in the international market. Belgian basic iron is offered at £4 7s 6d ($18.80); billets and sheet bars, £6 ($25.80) and finished steel £7 ($30.10), f.o.b. Antwerp.

Manufacturers in the Ruhr district have sold tonnages of wire, bars and plates to South America, but strikes over the longer day are interfering with Ruhr production.

British prices are lower, and a lull has followed the placing of large railroad and shipbuilding orders. The London underground railway has placed 85,000 tons of tunnel segments. British barmakers are completing the organization of a price fixing association. Makers of heavy steel products are unable to agree on a joint export selling combination. It is announced here that Australian sheetmakers are asking an increase in duty amounting to 30 shilling ($6.45) per ton.

Changes in the British market in the week bring the following products to the levels as quoted: Billets and sheet bars £8 ($34.40); bars for home use £10 ($43); bars for export, £9 15s ($41.92); English plates for home use, £9 15s ($41.92); black sheets £13 15s ($59.12); galvanized sheets £18 10s ($58.05); Northamptonshire No. 3 foundry iron £4 12s 6d ($19.88); domestic coke, £1 8s ($6.02).

Sterling exchange is figured on a basis of $4.30.

Japan's Repair Budget Is Held Down

Foreign Special Service

TOKIO, Japan, Dec. 20.—State expenditures for reconstruction proposed by the Japanese government in submitting its budget to the imperial diet are generally considered small amounting only to 448,570,000 yen ($219,799,300). The sum is to be expended over a period of six years. Subsidies the government purposes to grant those who build fireproof buildings are placed at 20,000,000 yen ($9,800,000); for the financial year 1924-1925, only 2,000,000 yen ($980,000). Business men of Tokio and Yokohama are disappointed at the amount.

Considerable complaint as to the government's policy is heard in the iron and steel industry. It is believed that it will result in a continuation of poorly constructed or semipermanent buildings.

Iron and steel merchants are refraining from stocking material, although

Yen—$0.49

the government steelworks has announced its willingness to book orders for February and March, buyers are not coming forward. Leading merchants in Tokio and Osaka have requested the steelworks to withdraw from the market until the trade is more stabilized, in view of the possible oversupply of material when the government's purchases in the United States and Europe arrive. The government steelworks announced a reduction in its prices of about 15 per cent for January. Bars are 112 yen ($54.88) per ton; sheets 114 yen ($55.86); channels 116 yen ($56.84), and angles 119 yen ($58.31).

Sales generally are small. Engineering works and car builders in Osaka are buying some pig iron. In Tokio stovemakers are in the market but purchasing is falling off. No one wants to stock ahead, being apprehensive of the credit situation. In the steel market some builders are inquiring for reinforcing bars, for repair purposes. No other promising buyers are in sight. Some Tokio galvanizers are operating on shortened time, lacking black sheets. Consumption of galvanized sheets, wire and nails is declining; manufacturers of small nails are closing their works.

Iron and steel prices are softer than a month ago. No. 1 Japanese pig iron is quoted 66 yen ($32.34) per ton; No. 2, 63 yen ($30.87) and Cleveland, British-made, 90 yen ($44.10). Bars are quoted at 5.80 yen ($2.84) per 10 kwamme (82.67 pounds); flat and square bars 6 yen ($2.84); plain sheets 8.50 yen ($4.16) and plates 4.80 yen ($2.35). Galvanized sheets are 1.65 to 1.75 yen ($0.80 to $0.85) per sheet.

Ruhr Coke Increases French Iron Output

European Staff Special

Office of IRON TRADE REVIEW,
23 Rue de la Bienfaisance

PARIS, Dec. 29.—The French minister of public works has asked for bids on 32,000 tons of semi-finished products which have been seized in the Ruhr and are to be liquidated to manufacturers of iron and steel in France. The tonnage will be prorated to customers based upon their producing capacity and stipulated that it will not be offered for resale in its original state. This is not expected to have a pronounced effect on the market.

Pig iron production is increasing as the coke situation becomes easier.

Franc—$0.055

Shipments of Ruhr coke to France now exceed the daily average for November by about 1000 tons. Lower prices are expected but it is not probable the present price of 212 francs ($11.66) per metric ton will be reduced before Feb. 1. Foundry pig chill cast No. 3 has been done as low as 380 francs ($20.90) by Eastern furnaces. Lorraine furnaces are offering this quality to Belgian consumers as low as 350 francs ($19.25) f.o.b. furnace. Hematite pig is quoted at 450 francs ($24.75) f.o.b. cars Paris.

The market for finished products is dull. Jobbers are liquidating stocks for inventory. Prices have sagged on all finished steel products. Merchant bars in the Lorraine district average 590 francs ($32.45) f.o.b. mill. Hoops from 1.5 millimeters to 3 millimeters gage are quoted at 880 francs ($48.40) per metric ton. A Meurthe-et-Moselle mill quotes tank plates 5 millimeters thick at 660 francs ($36.30). An order for 12,000 tons of rails for the Manchurian railways has been divided with Belgian mills. Manufacturers of wire products are competing keenly for business. Prices are being shaded on

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, January 7

British Market

Corrected to Date by Cable
Home Market Prices. Gross Tons at Works or Furnace

	$	£	s	d
SEMIFINISHED STEEL				
Billets, soft steel	34.40	8	0	0
Sheet bars	34.40	8	0	0
Wire rods	47.30	11	0	0
FINISHED STEEL				
Steel bars, England, ⅝ to 3-inch	43.00	10	0	0
Stele bars, England, ⅝ to 3-inch for export	41.93	9	15	0
Plates, ship, bridge and tank, England	41.93	9	15	0
Plates, ship, bridge and tank, England, for export	38.70	9	0	0
Plates, ship, bridge and tank, Scotland	40.85	9	10	0
Plates, ship, bridge and tank, Scotland, for export	38.70	9	0	0
Beams, England	40.85	9	10	0
Beams, England, for export	38.70	9	0	0
Beams, Scotland	40.85	9	10	0
Beams, Scotland, for export	38.70	9	0	0
Sheets, black, 24 gage	59.13	13	15	0
Sheets, black, 24 gage, for export	56.98	13	5	0
Sheets, galvanized, 24 gage	79.55	18	10	0
Rails, 60 pounds and over	40.85	9	10	0
Rails, 60 pounds and over, for export	37.66	8	15	0
Tin plate, base box 108 pounds	5.05	1	3	6
Steel hoops	49.45	11	10	0
Steel hoops, for export	53.45	11	5	0
PIG IRON				
Hematite, East Coast, Mixed Numbers	21.50	5	0	0
Hematite, West Coast, Mixed Numbers	24.83	5	7	6
Basic, Middlesbrough	20.43	4	15	0
No. 3 Foundry, Middlesbrough	21.50	5	0	0
No. 3 Foundry, Derby, Leicester, Nottingham	20.43	4	15	0
No. 3 Foundry, Northamptonshire	19.89	4	12	6
No. 3 Foundry, Staffordshire	20.43	4	15	0
No. 3 Foundry, Scotch	22.58	5	5	0
Ferromanganese, 76 to 80 per cent	73.10	17	0	0
COKE				
Yorkshire furnace	6.22	1	8	0
Yorkshire furnace, for export	8.60	2	0	0
Welsh foundry	6.99	1	12	6
Welsh foundry, for export	8.66	2	0	0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported
PIG IRON

	$	Pounds per metric ton (2205 lbs.)		
Hematite	24.94*	5	16	0
Foundry, No. 3	24.94	5	16	0
Stahleisen, Siegen	30.03	6	15	0
Foundry, No. 1	24.94	5	16	0
COKE				
Lower Silesian furnace	8.91	2	1	5
Lower Silesian foundry	8.91	2	1	5
SEMIFINISHED STEEL				
Billets	34.55	8	1	0
Sheet bars		Nominal		
Wire rods	40.85	9	10	0
FINISHED STEEL				
Standard rails	40.85	9	10	0
Merchant bars	38.70	9	0	0
Structural shapes	38.70	9	0	0
Ship plates	39.35	9	3	0
Medium plates, 3 to 5 millimeters	38.70	9	0	0
Sheets, 1 to 3 millimeters	38.70	9	0	0
Tin plate, per box of 575 kilograms	7.87	1	16	7
Plain wire	68.26	15	17	6
Bands and strips	51.19	11	18	1

All prices are f.o.b. furnace or mill.
*German prices now are quoted in pounds, sterling.

French Market

Prices Last Reported
PIG IRON

	$	Francs per metric ton (2205 lbs.)
Hematite, Lorraine	22.30	455
Basic bessemer, Lorraine	19.60	400
Foundry, Longwy, No. 3, sand-cast	19.11	390
Foundry, Longwy, No. 3, chill-cast	19.60	400
Ferromanganese, 76 to 80 per cent	75.95	1,550
COKE		
French furnace	6.62	135
German furnace, f.o.b. frontier*	10.78	220
German furnace, f.o.b. frontier**	11.42	233
French foundry	7.60	155
SEMIFINISHED STEEL		
Blooms	23.52	480
Billets	24.50	500
Sheet bars	25.48	520
FINISHED STEEL		
Standard rails	26.71	545
Merchant bars	28.91	590
Angles	27.93	570
Normal beams and profiles	27.93	570
Plates, ship and tank, 10 millimeters and thicker	31.12	635
Plates, bridge and tank, 5 to 10 millimeters	31.61	645
Sheets, black, 3 millimeters	33.57	685
Sheets, blue annealed, 2 millimeters	40.43	825
Shafting, cold-drawn, 40 to 60 millimeters	56.35	1,150
Bars, 2 per cent nickel steel	57.58	1,175

All prices are f.o.b. furnace or works.
*Up to 58 per cent of normal requirements.
**Over 58 per cent of normal requirements.

Belgian Market

Prices Last Reported
PIG IRON

	$	Francs per metric ton (2205 lbs.)
Basic bessemer, Belgian	18.06	420
Basic open-hearth, Belgian	18.92	440
Gray forge, Belgian	17.20	400
Foundry, No. 3, Belgian	18.28	425
Foundry, No. 3, Luxemburg	18.71	435
Foundry, No. 3, Lorraine	18.49	430
SEMIFINISHED STEEL		
Blooms	23.44	545
Billets	24.73	575
Sheet bars	25.59	595
Wire rods	35.48	825
FINISHED STEEL		
Standard rails	30.10	700
Merchant bars	29.24	680
Normal beams and profiles	27.31	635
Plates, 5 millimeters and thicker	31.39	730
Sheets, black, 3 millimeters	33.97	790
Sheets, galvanized, 1 millimeter	81.70	1,900
Plain wire	51.60	1,200
Galvanized wire	64.50	1,500
Wire nails	53.75	1,250

All prices are f.o.b. furnace or works.

attractive specifications for wire and nails.

During October imports of pig iron were 2922 metric tons and of steel 63,380. Exports were 47,626 metric tons of pig iron and 173,782 of steel.

During the first ten months of 1923 imports of pig iron in France reached 48,282 metric tons valued at 24,089,000 francs. Steel imports reached 456,657 tons worth 382,432,000 francs. During the same period, exports of pig iron amounted to 483,753 tons valued at 241,877,000 francs. Steel exports amounted to 1,485,282 tons worth 1,100,819,000 francs.

Belgian Mills Fear German Competition

European Staff Special

BRUSSELS, Dec. 21.—Recent developments in the Ruhr and election results in England have had an unfavorable influence on the Belgian market. Buyers believe Germany will soon re-enter export markets now that production has been resumed in the Ruhr and that keen competition and lower prices will follow. Furthermore this is the first time in history that no one party has control in English parliament and the Belgians are not sure that England will not raise a tariff barrier to protect home industries as this question was the subject of much discussion prior to election. If such a law is passed, Belgian steel manufacturers will be dealt a hard blow and will be obliged to seek new markets. At present Japan is buying heavily in Belgium but this is not expected to last beyond the period of reconstruction. Lorraine competition has again become a serious factor in Belgium as coke shipments from the Ruhr to

(Franc $0.05)

France are increasing daily. Pig iron prices have fallen 10 francs ($0.50) to 12 francs ($0.60) per metric ton. The domestic demand has tapered off to such an extent that tonnage will soon be available for export to meet foreign demand for French grades.

Merchant bars have dropped from 700 francs ($35) to 675 francs ($33.75). Structural shapes are quoted at 630 francs ($31.50). Plate mills are seeking tonnage and prices are unstable. Wire rods 5/16 inch and up range from 790 francs ($39.50) to 815 francs ($40.75) but demand is limited.

German Exports Decline During 1923

European Special Service

BERLIN, Germany, Dec. 21.—Exports of iron and steel products from Germany in September were 117,913 metric tons compared with 132,789 tons in August, 131,870 tons in July, and 236,709 tons in January, 1923. This represents a decrease of 14,876 tons compared with shipments of the preceding month and is only 10,762 tons more than the figure for June, which was the lowest since the first year after the war. September exports were 55,146 tons less than in June, 1921, and 136,861 tons less than in September, 1922.

Among the principal items exported in September were 25,588 tons of scrap, 15,556 tons of wire products, 5757 tons of nails and 11,161 tons of pig iron. With the exception of pig iron and wire products exports in September show a marked decrease compared with those in August.

Germany's imports in September amounted to 181,003 metric tons compared with 221,112 tons in August, 190,918 tons in July, 100,907 tons in January, 1923, and 233,080 tons in September, 1922. Among the principal items imported in September were 23,289 tons of pig iron; 33,558 tons of blooms, billets and sheet bars; 58,388 tons of bars and bands; 9783 tons of plates; 14,757 tons of wire; and 22,837 tons of rails.

Details of the exports for the first nine months of this year are given in the accompanying table:

British Export Prices Holding Steady

London, Dec. 24.—According to quotations compiled from customs manifests by the board of trade for November, not much change has taken place in British export prices since the previous month. Prices for carbon billets, beams, and galvanized sheets, which were rather lower in October, have recovered. Tin plate which in October reached the highest price for this year, now shows a decrease. Average British export prices for November are as follows:

	£	s	d	
Foundry pig iron	5	7	2	$ 23.30
Ferromanganese	15	8	0	$ 67.25
Carbon billets	11	10	7	$ 50.15
Beams	11	17	4	$ 51.60
Plates	11	5	2	$ 49.00
Galvanized sheets	21	16	0	$ 95.00
Tin plates	23	12	0	$103.00

British Foundrymen Meet

Sir William Larke, director of the National Federation of Iron and Steel Manufacturers, made the principal address at the annual dinner given by the London branch of the Institute of British Foundrymen at the Engineers' club, London, Dec. 14. During the dinner a cablegram from G. H. Clamer, president of the American Foundrymen's association, was read, expressing the appreciation felt by the American delegation as a result of the hospitality received while the delegation was in Great Britain last summer. V. C. Faulkner, president of the London branch of the Institute of British Foundrymen, was presented with a gold fountain pen by Oliver Stubbs as an expression of appreciation of his services to the institute.

Swedish Output Gaining

Washington, Jan. 8.—Swedish production of iron and steel has been gaining since the settlement of the strike about July 30, according to information to the department of commerce from Consul Walter A. Leonard, at Stockholm. Furnaces in operation at the end of September were 208, as compared with 201 at the end of August and 66 at the end of July. The feeling is expressed that much of the present activity is due to the accumulation of orders during the strike.

Everett Steel Co., Everett, Wash., has increased its capital stock from $30,000 to $75,000.

German Exports of Iron and Steel for First Nine Months of 1923

In Metric Tons of 2205 Pounds

	January	February	March	April	May	June	July	August	September
Pig Iron, ferro alloys and scrap	39,080	46,061	30,658	39,336	45,651	45,057	53,791	29,889	37,405
Cast Iron Pipe	4,036	4,797	3,391	3,350	1,967	1,932	2,077	4,032	1,648
Rolls	694	1,013	650	305	351	729	827	823	805
Cast Machine Parts	148	73	94	238	104	48	107	44	84
Other Castings	9,671	6,709	5,597	7,252	7,903	4,835	6,381	6,755	6,439
Blooms, Billets, Sheet Bars	13,256	8,106	13,610	11,583	10,077	4,805	11,114	13,482	2,450
Bars and Bands	41,556	33,240	11,568	20,401	15,215	9,575	6,615	9,057	6,564
Plates and Sheets	30,745	20,834	15,663	19,017	7,284	6,630	8,137	15,488	7,635
Tinplate and Galvanized sheets	1,954	2,588	2,004	1,968	697	1,151	1,189	1,558	1,397
Wire, rolled and drawn	17,567	18,996	11,052	4,180	4,868	3,514	5,927	10,888	15.556
Pipe	8,794	10,589	3,672	1,964	4,710	1,905	2,196	4,412	2,816
Rails and Track Fastenings	18,257	14,263	8,498	2,736	6,771	1,014	892	1,388	984
Wheels and Tires	4,443	3,088	800	774	638	72	1,075	2,220	1,434
Forgings	8,661	8,734	5,822	6,575	6,963	5,326	6,044	7,080	6,058
Bridge and Structural Steel	3,176	2,185	1,668	596	832	599	854	1,278	1,185
Boilers	2,296	2,009	2,041	1,254	693	890	1,014	992	1,273
Anchors, Hammers, etc	480	315	411	300	240	397	312	388	287
Agricultural implements	2,565	2,595	3,024	2,276	1,996	1,989	1,989	2,147	1,792
Tools	3,287	3,328	2,755	2,545	2,323	2,197	2,445	2,297	2,163
Screws, Bolts, Nuts, etc	1,487	1,074	1,055	1,183	936	925	974	861	1,026
Axles	320	187	210	185	224	184	177	97	119
Railway and Auto Springs	541	343	256	283	332	356	494	206	878
Wire Rope	983	979	1,096	680	451	150	1,113	946	703
Other Wire products	6,456	3,978	3,878	1,983	3,059	2,138	3,440	4,013	4,324
Wire Nails	6,860	5,302	5,896	3,782	3,449	3,301	4,609	5,537	5,757
House Hardware	2,532	2,486	2,754	2,656	2,117	2,568	2,328	2,294	2,483
Chain	639	598	523	633	676	500	802	496	386
Miscellaneous	6,235	5,515	5,207	5,178	5,078	4,358	4,947	4,121	4,271
Totals including items not specified above	236,709	209,965	143,853	143,212	135,605	107,151	131,870	132,789	117,913

Ask Lower Rate

On Iron and Steel Shipped to Indiana and Illinois

Pittsburgh, Jan. 8.—Hearings Jan. 3 and 4 before William A. Disque of the interstate commerce commision, Washinton, were attended by representatives of practically all railroads east of the Mississippi river and by representatives of local and nearby iron and steel companies as well. Iron and steel production are put in a class with many other commodities that do not return as much profit to railroads moving them, according to testimony at the hearing. On this account freight rates on the class of commodities in which iron and steel products are classified is higher than it should be, it was testified. Representatives of steel companies requested that iron and steel products be classified with articles which return about the same profit to carriers. This re-classification should bring about a lower freight rate on the former, representatives of steel companies aver.

F. A. Ogden of the Jones & Laughlin Steel Corp. in characterizing rates in the Pittsburgh district as unreasonable and unfair, declared that present rates on steel make it almost impossible for Pittsburgh manufacturers to compete in markets more than 75 miles west of Pittsburgh. He said that it costs $5 to $10 more to ship a ton of steel from Pittsburgh to Chicago than from Chicago to St. Louis. Producing figures to substantiate his statements, Mr. Ogden showed that it costs 19 cents per 100 pounds to ship steel from Ft. Wayne, Ind. to Alton, Ill., a distance of 314 miles, while it costs 30½ cents per 100 pounds to ship steel from Pittsburgh to Rushville, Ind., a distance of 341 miles.

In cross-examination by railroad counsel, Mr. Ogden introduced figures to show that the freight rate on iron and steel products shipped from mills in the Pittsburgh district to Indianapolis was double that charged mills in the Chicago district, shipping the same class of products to the same destination. The rate charged mills in the Chicago district is 15½ cents per 100 pounds, while the rate charged Pittsburgh mills is 31 cents. It costs mills in the Pittsburgh district 38½ cents to Richmond, Va., while Birmingham mills were able to make the same shipment for 28½ cents, according to Mr. Ogden. The rate to the St. Louis district was given as 43 cents. He said this rate should be reduced to 24.7 cents to allow mills in this district to compete with mills in the Chicago district. The rate from Chicago to St. Louis is 17½ cents.

H. C. Crawford, assistant traffic manager of the Bethlehem Steel Co., Johnstown, Pa., requested that if rates on iron and steel from this district are revised the rates at Johnstown be subjected to the same revision. Practically the same request was made by Harry Rhodenhouse of the Youngstown chamber of commerce in behalf of steel and iron manufacturers of the Mahoning and Shenango valleys.

Iron and steel manufacturers of Buffalo were represented by J. B. Daly, traffic manager of the Donner Steel Co. who asked that the parity of freight rates on shipments made from Buffalo and Pittsburgh to points in Indiana and Illinois be maintained if revisions are made in the Pittsburgh district.

Ask Lower Rate to Coast

Chicago, Jan. 8.—Representatives of Middle West manufacturers and trade associations, at a hearing before an examiner for the interstate commerce commission, have reiterated their plea that transcontinental railroads be permitted to waive the long-and-short-haul clause of the interstate commerce act to permit industries in the Chicago district to compete with eastern and European industries for business on the Pacific coast and in the Orient. The alternative is for mid-western industries to move to the seaboard or establish branches there, it was contended. Railroads are favorable to rate reductions to the coast to meet Panama canal competition.

Rate System Attacked

Hearings of testimony in the complaint of the Rainey-Wood Coke Co. against rates charged by the Pennsylvania and Reading railroad systems on coal from Westmoreland, Fayette and Washington counties, Pa., to the Rainey-Wood by-product coking plant at Swedeland, Pa., will begin soon. The hearings will be held at Harrisburg Pa., before the public service commission. The case is regarded as an important one and involves the question whether a rate should not be given on the coal from Swedeland, such as is accorded to wheat when shipped to an elevator and sent out as flour known as "milling in transit."

Foundrymen To Meet

The engineering extension service of Purdue university, Lafayette, Ind., has announced the second annual conference of Indiana foundrymen which will be held at the university on Jan. 17-18. Foundrymen of national reputation will present papers and lead in the discussion of foundry problems. The conference should prove of interest to manufacturers using foundry products as well as to foundrymen . A similar meeting last year resulted in the formation of the Indiana Foundrymen's association and the first annual meeting of this association will be held in connection with the conference.

Inland Steel Co. Acquires Milwaukee Sheet Mill

Chicago, Jan. 8.—Negotiations for the purchase of the Milwaukee Rolling Mill Co., Milwaukee, by the Inland Steel Co., Chicago, have finally been closed and control of the Milwaukee company, including responsibility for its obligations, from Jan. 1 forward has been assumed by the Inland company. Whether any new financing will be necessary has not been determined, according to P. D. Block, president of Inland. It may be 30 to 45 days before changes in personnel, if any, are made at the Milwaukee plant.

The Milwaukee company has ten sheet mills, five galvanizing pots and the cold rolling and other equipment requisite for an annual output of about 60,000 tons of black, blue and galvanized sheets. The company has had to buy its sheet bars in the open market. In the spring, the Inland company will complete four open-hearth furnaces at its Indiana Harbor works. The Milwaukee plant, which may not lose its corporate identity, will provide an outlet for part of this increased steel capacity. The Milwaukee plant began operations in 1920 and is in West Allis, a suburb of Milwaukee.

With the Milwaukee plant, Inland now has a total of 28 sheet mills and an annual capacity of steel sheets approximating 180,000 tons. Selling for the Milwaukee unit will be done through the Chicago office of Inland.

Scrap in Better Demand

(*Concluded from Page* 140)

Demand for these specialties, and some scarce foundry grades has bolstered prices and given the entire list an appearance of strength which is hardly warranted.

The largest transaction heard of was 4000 tons of rails for rolling to a consumer in the district. Sales are chiefly in small, scattered lots for prompt delivery.

Scrap Market Looking Up

Birmingham, Ala., Jan. 7.—While the old material market is looking up no large business is being done. Heavy melting steel is still low and Columbus, Ga., dealers are said to be disposing of a large stock. No. 1 cast scrap is finding a little better demand. Stocks on hand are well held and dealers are looking for an advance. Some foundries are showing interest and are buying a little.

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Tax Reduction Everybody's Job

IN THE tax reduction program proposed by Secretary of the Treasury Mellon and now being considered by the house ways and means committee, congress has before it the most important and urgent peace-time reform of a generation. The Mellon plan has the whole-hearted and unqualified support of President Coolidge. Moreover, it has struck a note of popular approval rarely equaled in the annals of the American government.

The program is sound. It is urgent. It is sweeping in its benefits and its promised economic effects. Its chief aim is to lighten the onerous and intolerable burden of taxation now upon the shoulders of individuals and of business. The measure would discriminate in favor of earned incomes and it would lower the high surtax brackets on large incomes in order to check the flow of investment funds into tax-exempt securities and divert a larger share into more productive enterprises.

The reduction in taxes has been made possible by the creation of a government surplus of approximately $320,000,000. This the administration would pass along to the country in lower taxes. The some 7,000,000 of taxpayers would benefit directly, but every member of society would share in the general good. High taxes indisputably constitute an important factor in prices and in the high cost of production and of living. All consumers would reap the fruit of lower tax burdens.

Despite the unquestioned popularity of the measure and notwithstanding the administration's influence behind it, great obstacles in its path are being reared in congress. Back of this opposition lurks the insidious figure of politics in its narrowest sense. Advocates of the soldiers' bonus are fearful of the passage of the Mellon plan in its present form. That would eliminate the possibility of a large cash payment to able-bodied ex-soldiers whose votes are much coveted by the politicians in congress, more concerned with their own careers than with the country's welfare.

Hostility to the reduction of surtaxes and the fight to re-enact the wartime excess profits tax are other elements of opposition to the Mellon program aside from the veterans' organizations. The radical group in the Republican party, determined to "swat the rich" at all costs, want the return of the vicious excess profits tax and oppose lower surtaxes. Respecting the latter, they close their eyes to the fact that rich men can now escape these high levies through tax-exempt securities, and that a reduction would tend actually to increase the amount of taxes paid to the government. Moreover, under the Mellon plan, 70 per cent of the proposed income tax reduction would be distributed among the large majority of taxpayers with incomes of $10,000 and less.

Congressmen literally are being swamped with communications from their constituents urging passage of the Mellon plan. Senator Simeon Fess, of Ohio, in replying to one of these letters complainingly referred to the tax reduction as a business man's matter. It is far more than that. It is a matter of vital and universal interest to every man, woman and child in the country, whether producer or consumer. It is true that mimeographed copies and form letters sent to congressmen are less effective than communications expressing the individual sentiments in his own way. The tax measure is not a business man's bill. It is a popular measure in the truest sense. But business men can and should take the lead in bringing home to congress the overwhelming sentiment existing in the country in its favor.

Consumption Figures Point Future

WITH the record for 1923 now complete and generally accepted as a very satisfactory exhibit from a business viewpoint, contemplation of the outlook and possibilities of 1924 are in order. Past performance, especially that of recent months, undoubtedly should serve as a guide to what the future may be expected to bring forth. Executives now are studying this record of the past with a view of formulating their policies of management and their expectations for the coming year.

In iron and steel, the story of 1923 consumption as compiled by IRON TRADE REVIEW from producers' records and published as usual in its annual statistical number last week, is illuminating in indicating the character of the market during the coming months. Taken in connection with other definite information as to underlying conditions in various industries, mill bookings of certain products for 1924 delivery now in hand, etc., the picture it presents is an encouraging one.

Summed up, the high production of iron and steel

in 1923, it is clearly shown by the IRON TRADE REVIEW figures, was due to the expanding activity in the railroad, automotive and building fields. These three channels of steel outlet, took in direct shipment a total of 55 per cent of the finished material distributed by producers the past year. The indirect requirements probably would bring the tonnage absorbed by these three branches of demand up to fully two-thirds of the country's output. The railroads themselves accounted for practically one-third. In 1922 the sum of the direct railroad, building and automotive consumption of steel was substantially 47 per cent.

These three factors having been mainly responsible for the broad steel market in 1923, will continue in an enlarged scope for the first half of 1924 at least, all indications now declare. Orders already placed for next year such as rails with which the mills are filled to mid-year, the inquiries now in sight and the general prospects, reasonably insure a movement of tonnage from the mills to the railroads up to July that will closely parallel that of a similar period in 1923. Building work and automobile output, if anything, should be heavier the first half of this year. Reviving activity in such lines as the agricultural implement industry should account for any slack that may develop.

In the opinion of some students of the market among steel executives the IRON TRADE REVIEW consumption figures for 1923 indicate a production in 1924 that will be only slightly less, if at all, than the corresponding record in 1923. Interpretation of these figures in this way adds a new value to the informative and the advisory character of this tabulation of steel distribution which was originated and first exclusively presented by this publication several years ago.

Is the Scrap Dealer Necessary?

AN ARRANGEMENT whereby the New York Central railroad hereafter will ship all its steelworks scrap to a Cleveland consumer based on trade paper quotations is a matter of special interest to scrap dealers. This is not so much because of the individual effect of the New York Central's action, but because it establishes a precedent. By this plan the railroad company estimates it will save $250,000 annually. Other roads will observe the results and will take such action as they think best for their own business.

Heretofore railroads have disposed of their scrap, except that which they reclaimed, by selling to the highest bidder. Most of the scrap has gone to dealers who have made a profit in reselling it. In transacting their business, however, dealers do more than take the profit. The handling of scrap by dealers is a real industry. It is not merely a matter of buying discarded iron and steel at a certain railroad point and shipping it to a consuming point. The material must be prepared for the consumer and this requires an expensive outlay of shears, cranes, locomotives and other equipment, and the maintenance of organizations trained in the preparation of it for the market.

No matter how railroad scrap is handled in the future, it will have to be prepared for consumption. Naturally, the dealers with their mechanical facilities have certain advantages, which are reinforced by their extensive experience and wide knowledge of scrap. It is to be expected that their resourcefulness will enable them to adjust themselves to changing conditions and to continue to serve as useful a function in the future as in the past.

Paying Premiums for Attendance

AN EXPERIMENT that will be well worth watching to determine its effectiveness in obtaining continuity of service from employes is that which has just been announced by a large manufacturer of cast iron pipe in the Birmingham, Ala., district. It has some features that are of special interest to employers who have sought to reduce the cost of labor turnover by rewarding attendance and stimulating interest.

For every day on which an employe worked in 1923 he will receive $1 in 1924, the total amount to be paid to him in 26 equal installments. The payments will be made every two weeks, other than the regular pay days, and in separate envelopes; evidently to keep the thought of this extra compensation apart from regular wages. The minimum any employe may receive in this manner is $156; that is, he must have worked at least 156 days in 1923 to be eligible to the premiums. And to receive all that is due him, he must remain in the service of the company throughout 1924. Boys will receive 50 cents for each day worked in 1923.

Many methods have been devised by business institutions and manufacturing interests with a view to retaining competent and loyal workmen. They range from a bonus to outright gifts at the close of the year; some are worked out scientifically, others are haphazard plans depending on circumstances and individual feelings.

Bonus systems probably are in greater application today than ever before, notwithstanding the high level of wages. The majority of them provide for extra compensation for increased output; the theory being that this induces regular attendance. The plan put in operation at the Birmingham foundry obviously contemplates greater output through steady attendance. The record of six months' or a year's experience should bring to light some interesting facts bearing on incentive plans. The system will appeal to working people especially if they understand that something is not being withheld from them today in order to provide a premium payment for some future time.

Action Speeded on Tax Measure

House Ways and Means Committee Resumes Consideration of Revenue Bill After Holidays---Will Reach Floor of House Within Few Weeks—Administrative Features of Law To Be Simplified by Congress

WASHINGTON, Jan. 8.—Within the next few weeks a tax reduction bill along the lines of the recent program of Secretary of the Treasury Mellon, which has attracted a sentiment in favor of its enactment that has become nationwide, will reach the floor of the house from its process of being sifted through committees. A subcommittee of the ways and means committee of the house of representatives remained in session during a large part of the holiday season in the interest of an expeditious report. Consideration has now been resumed by the full committee, and discussions affecting the measure are being speeded. The text of the redrafted revenue act, which recently was made public shows that aside from the Mellon tax plan, the measure as drawn details provisions for simplifying and clarifying the administrative functions of the revenue law. The section in the former revenue act, with reference to the reorganization of corporations has been rewritten to eliminate existing uncertainties in the present act and to include other usual forms of corporate reorganization in aid of business, such as the splitting of one corporation into two or more corporations.

Provisions have been inserted to prevent the use of this reorganization section to escape proper taxation by increasing the basis for depreciation or depletion, or by increasing the basis of gain or loss from the sale of assets transferred in connection with a reorganization, or by distributing as capital gain what in effect are dividends out of earnings.

Deduction Is Limited

In the new measure, the deduction for depletion is limited to 5 per cent of the net income from the property depleted. In the case of a trust, where the trustee has the discretion to distribute or not, the income is taxed to the beneficiary if distributed and to the trustee if not distributed. Where the grantor of a trust reserves the right to change the trust in favor of himself, the income of the trust is taxed to the grantor.

The penalty under section 220 of the former revenue act, which seeks to penalize corporate forms used to avoid imposition of surtaxes on the stockholders, now is based on all the income of the corporation which would be taxed in the hands of an individual.

The principle contained in the 1918 revenue act that liquidating dividends constitute a sale of the stock instead of a distribution of earnings has been restored. This puts liquidating dividends within the capital gain section of the act and recognize the real effect of such dividends.

The application of the present law requiring an income for a fractional part of a year to be placed on an annual basis is restricted to cases where a return is made for a part as a result of the voluntary act of the taxpayer in making a change in his taxable year.

A board of tax appeals is created to hear all appeals from the assessment of additional incomes and estate taxes, which will sit locally in the various judicial circuits throughout the country. The cases of both the government and the taxpayer are presented before the board, and the practice there is similar to that before the interstate commerce commission. Upon a decision in favor of the government, the additional tax can be assessed by the commissioner of internal revenue and the taxpayer is left to his remedy in the courts for a recovery of the tax. If the decision is in favor of the taxpayer, the commissioner may not assess the tax but is left to his remedy in the courts in a suit to collect the additional tax. In a hearing in the courts, the findings of the board shall be taken as prima facie evidence of the facts contained therein.

Under the newly drafted bill, earned income, defined as wages, salaries, and professional fees, is given a credit of 25 per cent of the amount of the tax attributable to the earned income.

The normal tax on the first $4,000 of net income is fixed at 3 per cent, and upon the remainder of the net income at 6 per cent. The surtax rates begin at 1 per cent on net income from $10,000 to $12,000; additional 1 per cent for each $2,000 of net income up to $36,000; then 1 per cent additional for each $6,000 of net income up to a total of 25 per cent of $100,000 and over.

Capital assets, in the new bill, are defined as property held by the taxpayer for profit or investment for more than two years. Upon the sale of capital assets the tax on the gain from the sale is limited to 12½ per cent of the gain, and the amount by which the tax is reduced because of such a loss is limited to 12½ per cent of the loss.

The taxpayer is permitted to take as a deduction from his gross income in determining his taxable income interest on indebtedness and losses of a nonbusiness character only to the extent that the sum of these two items exceeds his wholly tax exempt interest.

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Penn Seaboard Pays Notes

Elimination of its short-term notes through conversion and the payment of these notes at maturity has removed the final pressing obligation of the Penn Seaboard Steel Corp., Philadelphia, and officials of the company say that it now is in a position to work out plans for expansion. Working capital is $1,045,153. Current assets of $2,380,045 compare with current liabilities of $1,334,892.

The Line Material Co., South Milwaukee, Wis., maker of transmission line materials and supplies, has increased its capital from $235,000 to $735,000.

The Business Trend

January 10, 1924

BY JOHN W. HILL, FINANCIAL EDITOR

TRADE has entered 1924 with a more confident step. Forecasts have been largely cheerful, and basic conditions admittedly are sound. With the passing of the year-end lull various important lines are resuming at the pre-holiday rate or better.

Interest is centered upon the probable trend for the first quarter. The stock market is being watched for an indication. Thus far it has been encouragingly strong. Industrial stocks have entered 1924 on the same average level as one year ago.

Financial weakness has been most pronounced in the European exchanges. The first week of the new year saw francs sink to the lowest point in a half century. British sterling was the lowest in nearly two years.

Political uncertainties in England have been a leading factor in causing sterling to fall. Francs have been influenced by the great burden of post-war debt in France. Underlying all other factors is the great unsolved problem of reparations and German recuperation.

Basic Lines Brighten

Three basic and barometric industries are giving signs of life. They are iron and steel, building and automobiles. Of these the automobile industry is holding the center of the stage, with the launching of January motor shows. These shows will indicate the tendency and probable volume of demand. Manufacturers feel assured of a big year and are in the market for steel to meet requirements for expanded production schedules.

All signs point to a substantial building year in 1924. The Copper and Brass Research association estimates the total volue of construction in 1923 at $5,022,900,000. It forecasts a 1924 total of $4,835,935,000, or 18 per cent less than last year. This total, however, would rank the year as one of the largest on record.

Building To Be Good

Good building activities will stimulate the iron and steel and metalworking industries. Railroad buying also will be a factor in these industries. The rise in December car awards to the highest total since last March reflected improving demand.

Expenditures of nearly $1,000,000,000 are contemplated by the roads in 1924. The possibility of this is better with rising earnings and enhanced credit standing. November earnings showed a distinct gain over November 1922.

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One month ago	One year ago	1913
Business failures...	414	348	461	445	...
Cash Ratio Fed. Res. System %..	73.8	73.3	76.4	71.3	...
Loan Rate, 4-6 mo. N. Y. per cent..	4¾-5	4¾-5	5	4½-4¾	4¾
Aver. 25 industrial shares	$110.64	$109.45	$108.80	$110.35	$58.19
Average 25 railroad shares	$58.98	$57.72	$59.81	$61.71	$82.90
Average 40 bonds.	$77.15	$76.55	$76.99	$76.79	$93.00
Car loadings (week ended Dec. 22..	877,557	899,522	990,217	834,591	*648,406
Bank Debits, 244 cities (000 omitted)	$8,652,501	$10,780,919	.....	$7,817,398	.....

*1920.

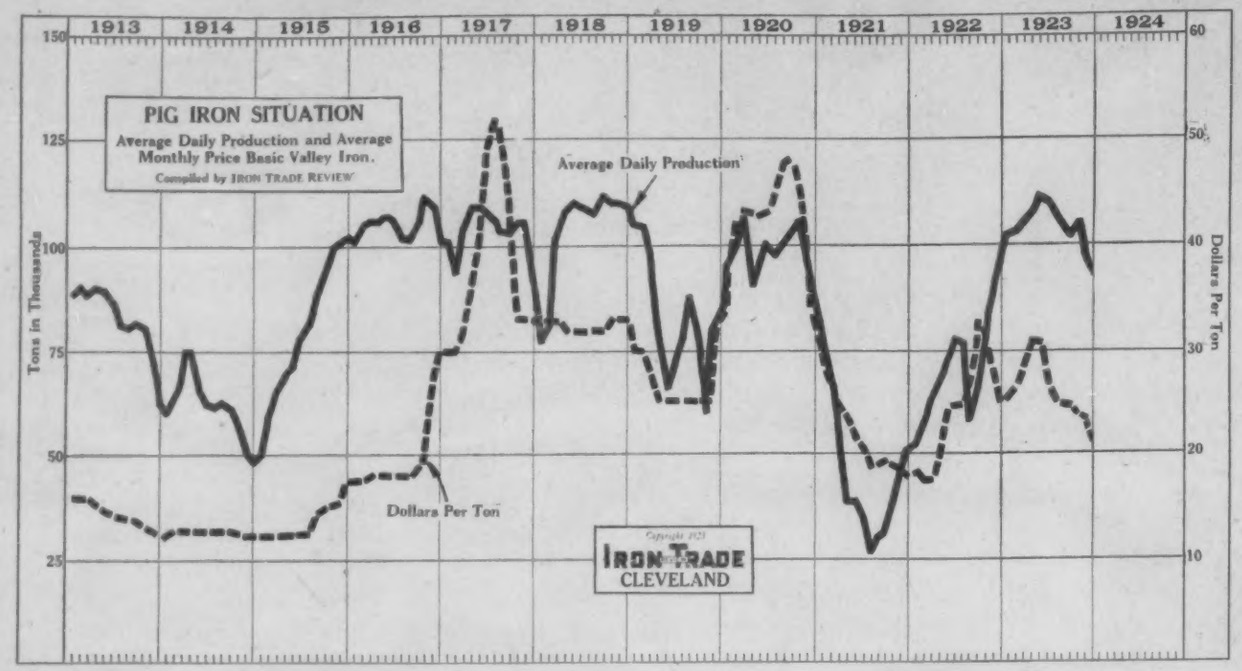
FOREIGN EXCHANGE (Demand)

	Normal	Last week (Close)	Week before	Month ago	Yr. ago
Sterling	$4.86	$4.29	$4.33	$4.36	$4.64
Francs	19.3c	4.93c	5.13c	5.33c	6 91c
Lira	19.3c	4.30c	4.33c	4.33c	5.05c

MONTHLY COMPARISON

	November	Month before	Year ago	Monthly average 1913
Dodge building Awards in 36 states	$318,828	$360,687,000	$265,000,000	$82,126,000
Business failures: Number	1704	1673	1737	1336
Liabilities	$50,291,708	$79,301,741	$40,265,927	$22,732,000
Exports	$404,000,000	$402,000,000	$380,056,000	$207,000,000
Excess of gold imports	$39,011,000	$28,550,000	$17,400,000	†630,716
Bureau of Labor Price Index....	152	153	156	100
Bradstreet's Price Index	145.4	141.6	149.1	100
Economist's British Price Index	4541	4320	4283	2717
Cost of Living Index	165	164.1	158.4	100
New incorporations	$909,693,800	$700,708,300	$843,652,900	$172,301,000
Railroad net earnings ...	*$102,746,000	$92,200,000	$85,205,000	$59,301,000

†Monthly average excess exports. *October.

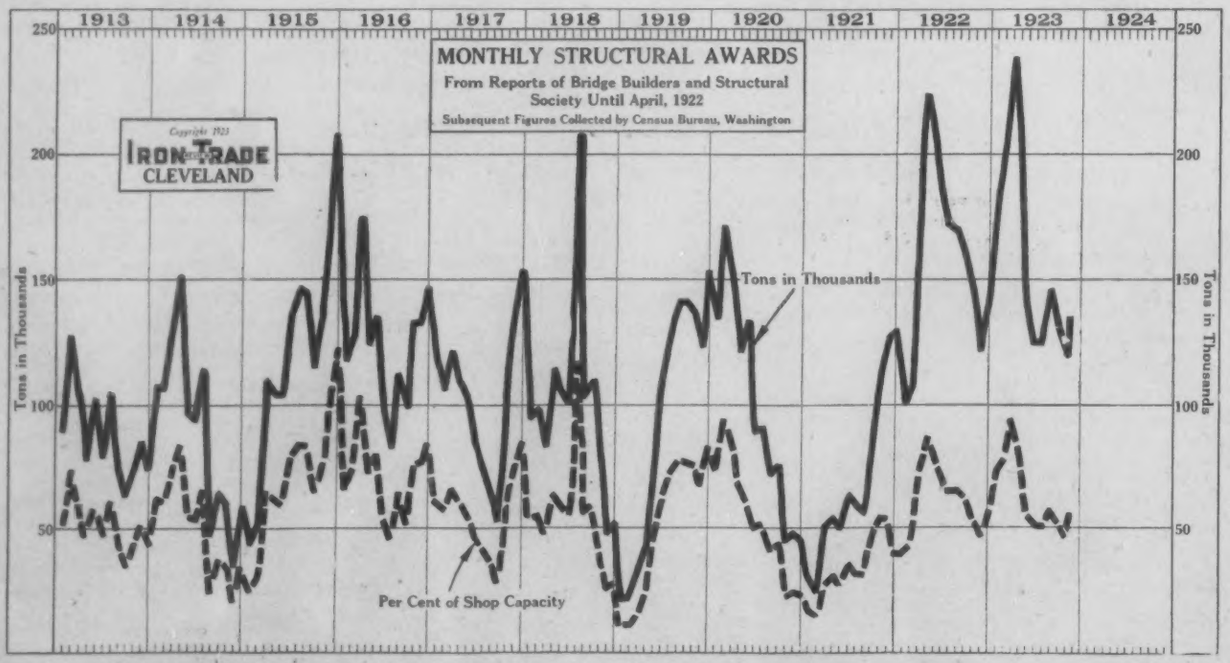

PIG IRON SITUATION
Average Daily Production and Average Monthly Price Basic Valley Iron.
Compiled by IRON TRADE REVIEW
Average Daily Production
Dollars Per Ton
Tons in Thousands
Dollars Per Ton
IRON TRADE
CLEVELAND
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924

Pig Iron Situation

THE output of coke and anthracite pig iron of 40,019,129 tons in 1923 was the largest for all time. In December the daily average production rate continued its decline. However, the month ended with a net gain of one furnace in blast, indicating that the decline is near the bottom. The record for December was 93,736 tons daily average, the lowest since October, 1922 The price of basic valley pig iron continued to decline in December.

Monthly Structural Awards

BOOKINGS of structural steel in 1923 were the largest on record, aggregating about 2,100,000 tons. That represents about 70 per cent of the country's shop capacity. In 1922 the bookings were estimated at 1,920,000 tons. November awards showed the first gain since August. The estimated total for the month was 135,000 tons, or 54 per cent of capacity. The October figures were 120,000 tons or 48 per cent of capacity. The year's high month was in March.

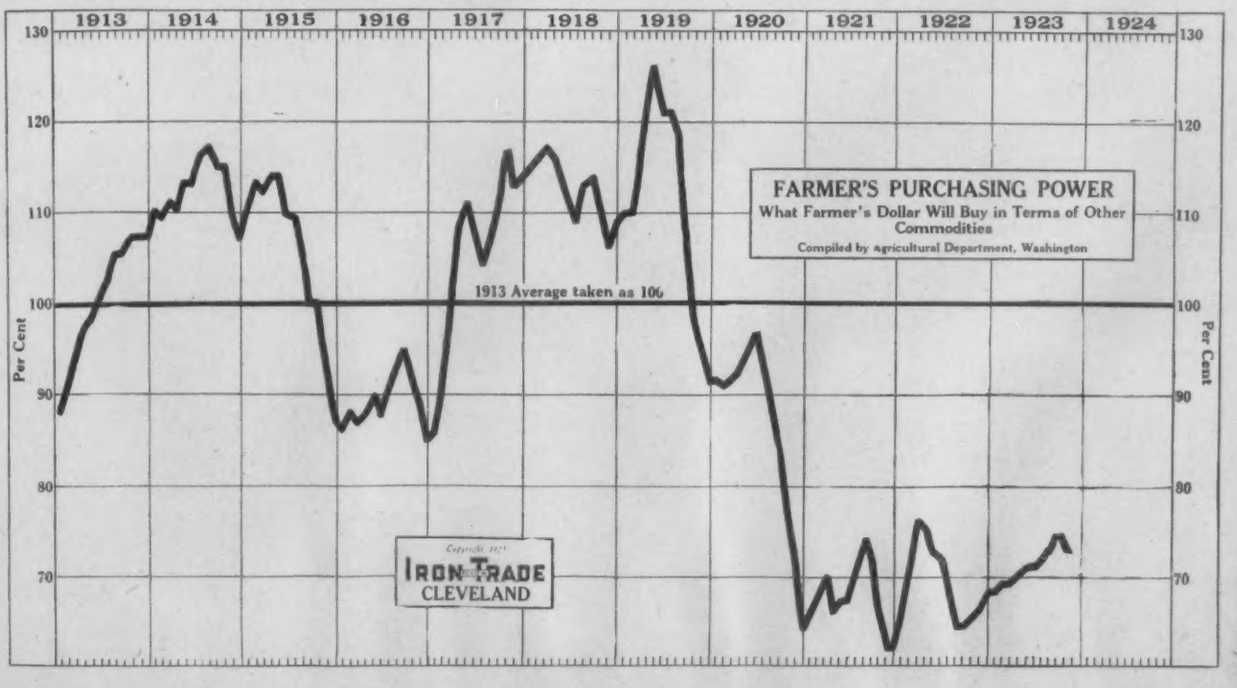

MONTHLY STRUCTURAL AWARDS
From Reports of Bridge Builders and Structural Society Until April, 1922
Subsequent Figures Collected by Census Bureau, Washington
IRON TRADE
CLEVELAND
Tons in Thousands
Per Cent of Shop Capacity
Tons in Thousands
Tons in Thousands
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924

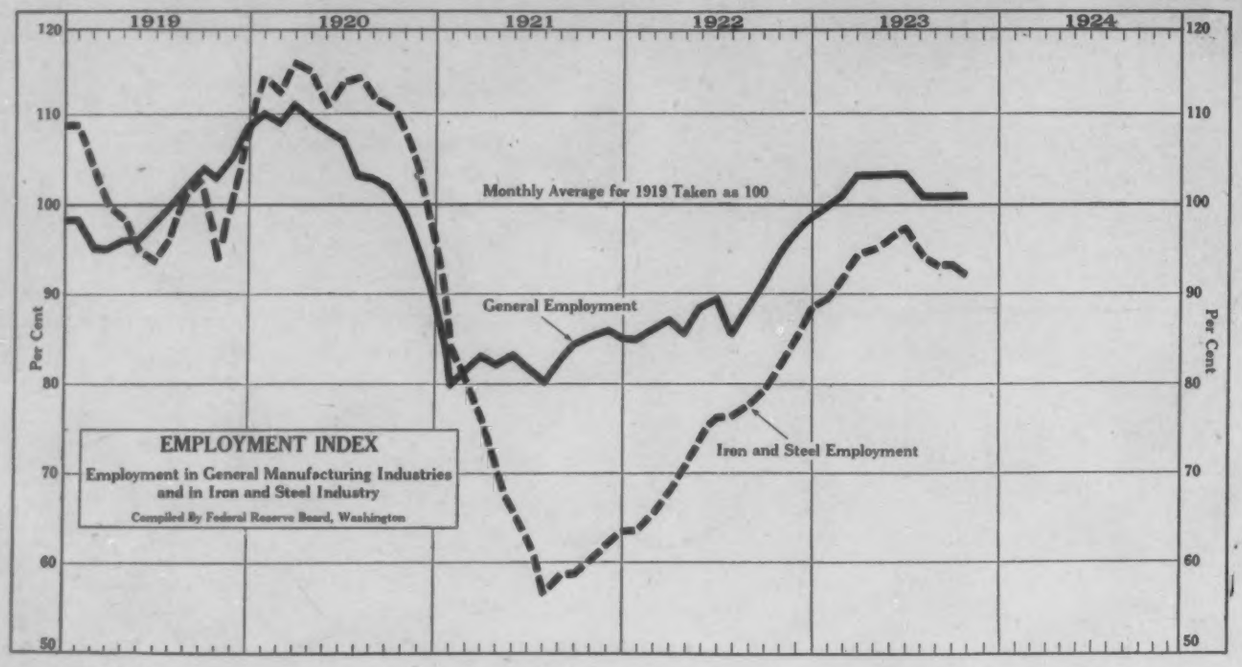
Index of Basic Production

PRODUCTION in basic industries in November declined two points below October. However it was two points above the year's low ground in September. In November the index, compiled by the federal reserve board, stood 16 per cent above the 1919 average. This was 9 per cent below the year's peak in May, but it was identical with the level for November, 1922. Seasonal influences probably will be a factor in causing a lower index when it is computed for December.

Farmer Purchasing Power

THE purchasing power of the farmer showed a slight decline in November. This is a normal tendency. The decline was caused by the autumn recession in grain and livestock prices. Although the farmer's purchasing power of 73 per cent of 1913 was larger than in October it was the highest for any November in four years. The level was 10 per cent above 1922, 19 per cent above 1921 and 4 per cent over 1920. Large mail order sales reflect the farmer's improved position.



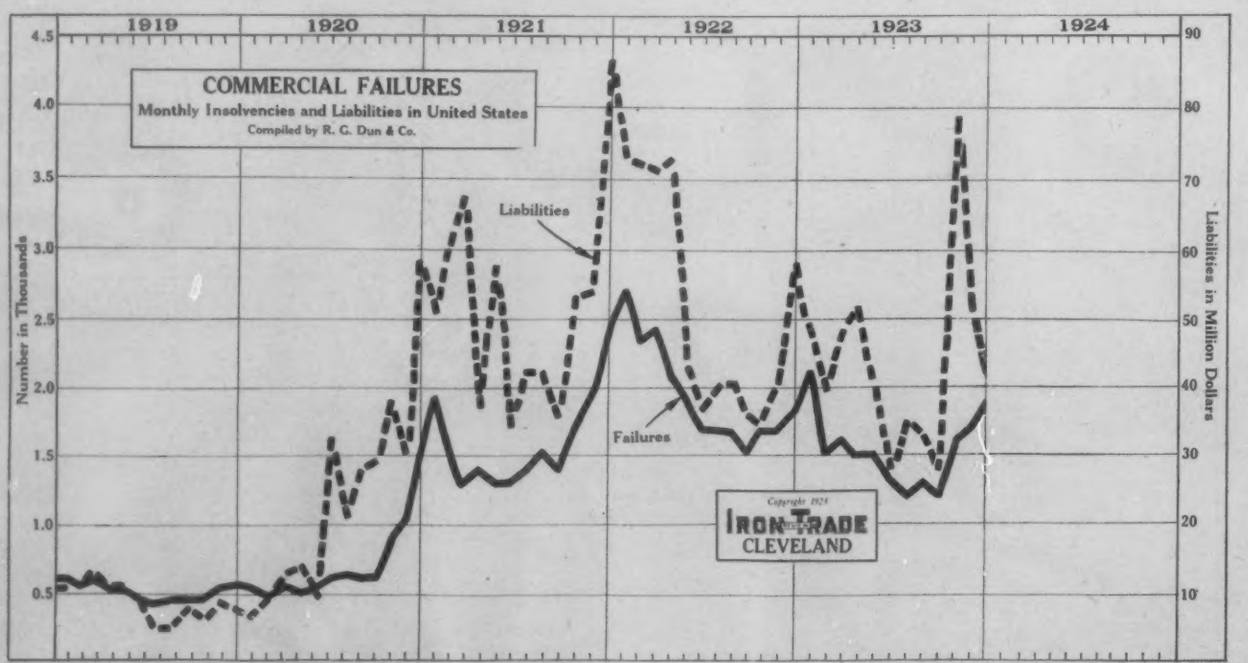


Employment Index

THIS diagram, a new and valuable addition to the Business Trend, is based upon an important weighted index of employment in manufacturing industries in the United States just completed by the federal reserve board at Washington. The index reflects employment conditions in 33 separate industries. The accompanying chart shows the general index and that for iron and steel. At present steel employment is relatively lower than that for all industries.

Commercial Failures

THE record of business failures in the United States in 1923 reflects a period of prosperity. Business profits were fair and companies were under no pressure of liquidation. The number of failures and of liabilities was the smallest in three years. There were 20 per cent fewer faults than in 1922 and liabilities were 14 per cent lower. Of every 1000 companies in business nine failed in 1923. This compared with a ratio of 12 failures for every 1000 firms in 1922 and 10 in 1921.



From Anvil to Drop Hammer

American Drop Forge Industry Dates from Modest Beginning in Southington District of Connecticut — Progress Follows Improvements in Design of Hammers

BY H. R. SIMONDS

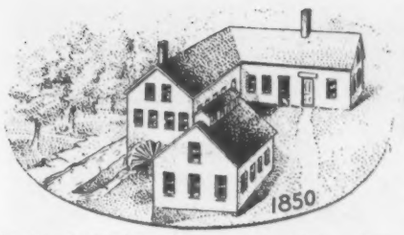


Fig. 1—A forging shop at Plantsville, Conn., in 1850

HAMMERING hot iron or steel now is a common method of producing certain automobile parts just as it was the way carriage hardware was formed 50 years ago. The difference between today's practice and that of 1870 is in the method of applying the hammer to the work. Muscle has given way to steam and electricity. The one-man shop has been replaced by great plants employing hundreds and even thousands. These are the outward signs of a series of developments growing out of the industry and inventive genius of a few Connecticut men who were the first to have the vision of a successful power hammer.

The ultimate metamorphosis of the blacksmith's sledge is the modern massive steam hammer, which accomplishes in one stroke the day's work of a dozen blacksmiths. But between the steam hammer and the light trip hammer is the board hammer—the backbone of the drop forging industry.

The board hammer, while less romantic than the steam hammer, nevertheless, is the typical tool for light work and is a direct descendant from the earliest power hammer. Therefore it is the history of the board hammer that is unearthed in any attempt to trace back the drop forge industry to its origin.

Among the sturdy blacksmiths in Connecticut in 1840 were the brothers Jim and Henry Smith, who had a shop in Milldale within the limits of what is now known as Southington. Jim Smith, familiarly known as Uncle Jim, seems to be the one who had the original conception of a device to reduce manual labor in drawing out steel for carriage bolts. He first devised a crude hand-operated drop hammer which he raised with his right hand by means of a rope over a pulley, and then allowed to drop by simply letting go of the rope. Near the Smith blacksmith shop there was a grist mill operated by water power, and it was not long before Jim Smith had found a way of making this water power help him raise the weight.

Early History of Forging

The first step, after the direct lifting of a weight by a rope over a pulley, was to drive the pulley shaft by water power. The rope from the hammer was cinched around the pulley which was smooth and broad so that by pulling on the loose end this pulley would grip the rope and raise the weight with little actual effort on the part of the operator. To release the weight the rope was slackened when it easily slipped around the smooth pulley and allowed the weight to drop. This crude method of forging was carried on for several years and the little shop gained considerable reputation in the production of carriage bolts and other carriage hardware.

In the fall of 1849 a cousin named Fred Smith saw possibilities in further developing the contrivances which Jim Smith had rigged up, and in 1850 the three Smith boys joined forces and moved their little shop to a point on the river now known as Milldale Junction, where water power could be used from the same dam that operated the grist mill. It is interesting here to note that the company still is operating on the original grist mill water power franchise which provides that the power must be used for mill purposes, evidently meaning grist mill, but as the word "grist" was left out, the state authorities feel that the plant is close enough to a mill to avoid any difficulty on that score. With the enthusiasm born of a new plant and better water power facilities rapid progress was made in building up a larger business. For many years the scheme of having a rope cinched over a shieve was the sole

FIG. 2—TRUCKING THE FIRST LARGE DROP HAMMER THROUGH THE STREETS OF SOUTHINGTON

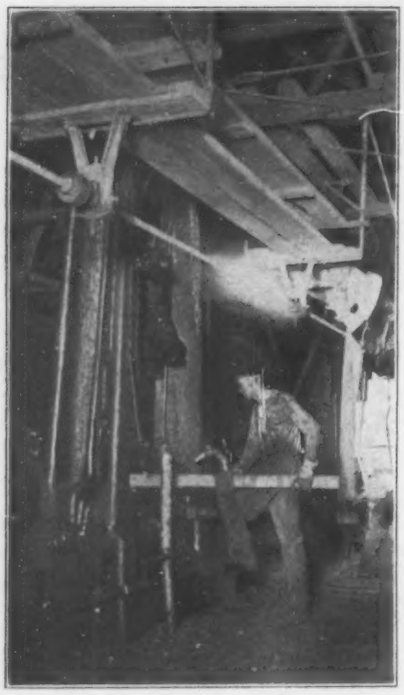


FIG. 3—A 2000-POUND BOARD HAMMER IN OPERATION

method of raising the hammer.

More men were employed, more hammers constructed, all of similar design, and within a few years the company was well known throughout the southern part of Connecticut. About this time Wilson W. Knowles joined the Smith boys and his ability as a mechanic was quickly recognized. He soon became familiar with the Smith method of mechanically raising hammers and in 1869, joined with J. Atwater and Alfred M. Smith (no connection with the other Smiths), in starting the plant which now is known as the Atwater Mfg. Co. Mr. Knowles came from a family of blacksmiths. His brother was a producer of the finest hand forged shingle shavers of that day, and it is from this brother's part of the family that the Wilcox & Crittenden Co. of Middletown has developed.

Some time between 1860 and 1870 two Blakeslee brothers joined the force at the Smith plant and in 1877 these two left to start a plant of their own. This was built within a short distance of the Smith plant at what is now known as Plantsville. The new company, known as the Blakeslee Forging Co., has been in operation ever since.

Progress in Design

It was not long before the crude method of lifting the hammer by means of a rope and shieve was superseded by other schemes. One of the first was the use of a rotating arm mounted with ratchet connection on the end of a shaft. A short rope or wire was fastened to this arm and to the hammer. As the arm moved up the hammer moved with it, but as it passed by a vertical position the ratchet device permitted the hammer to drop almost as if free. Soon after the blow the steadily revolving shaft would pick up the arm again and the process would be repeated. This hammer, known as the Peck lift hammer, was popular for 30 years or more.

About 1880 the earliest form of trip hammer came into use. This is a different principle from the drop hammer, and while extensively used for extremely light work, will not be considered in the present article. In 1890 the earliest board hammers were produced in several leading plants and within a few years after this board hammers had replaced nearly all other forms of mechanical drop hammers. Ever since 1890 engineers have experimented with means of lifting the hammers other than by a board. Cables clamped between rolls have been tried. Gears have been used. One experimentator used two large odd shaped cams operating against rollers which in turn carried the hammer. These cams were so designed that at the upper position they permitted the weight with its rollers to drop freely onto the work. All attempts at improving on the use of a board have so far failed and today the modern board drop hammer is practically the universal tool in the industry, excluding steam hammers, of course, which usually are employed on heavier work.

Board Hammer Favored

The modern board hammer is adapted to forging light pieces and on work ranging from about 1 pound to 15 pounds has few competitors. One manufacturer using nearly all types of hammers says that the most efficient application for work up to 1½ pounds is trip or helve hammers; from 1½ pounds to 25 pounds, board hammers; and from 25 pounds up, steam hammers. Other authorities feel that the 25-pound mark is too high, and there is little question but that many shops are operating steam hammers efficiently on work as light as 20 pounds and in some cases 15 pounds or less.

The board hammer consists essentially of a weight free to slide up and down in vertical guides. To the top of this weight is fastened one or more hardwood boards each about 2 inches thick and 8 or 10 inches wide and 8 feet or more long. The boards extend in a vertical position with the flat side parallel to the front of the machine. Parallel steel rolls which engage the upper part of the board when the weight is in the down position operate much after the method of the familiar clothes wringer in rolling the

FIG. 4—THE PICTURESQUE FORERUNNER OF THE DROP FORGE INDUSTRY

board upward and thus raising the weight. One roll, the front roll, is mounted on adjustable arms so that it may be moved towards or away from the other roll. When the weight nears its upper position, it trips a dog which spreads the rolls and allows the board and weight to drop.

Board Hammer Holds Own

Based on this fundamental principle the design of board hammers varies greatly. The weight of the hammer, or ram as it is usually called, varies in practice from about 500 pounds to 3000 pounds, and just recently a hammer with a 4000-pound ram has been tried out and is said to be working satisfactorily. The travel of the weight and, therefore, the distance of drop varies from about 3 to 6 feet. By far the most popular machine is one having a 2000-pound ram with a 5-foot travel. The boards are made of maple, are fastened to the hammer by means of steel wedges, and have a life of from one hour to one month. No good substitute for the natural board has yet been developed, although there is some room for improvement. The changing of boards as they wear out requires an appreciable amount of time during which the machine must be idle. The gradual wear of the boards is taken up by an adjustment of the back roll.

Board hammers are used on a great variety of work, the most typical of which are small articles such as crane hooks and automobile parts. These are forged between dies and the die-making industry, therefore, becomes an intimate and important factor in drop forging. The design of dies and the operation of the hammer interlock so closely that a diemaking department almost always is found in a drop forge plant. As operations of a hammer vary greatly according to the nature of the piece which is to be produced it is difficult to give any typical sequence. However, the production of small crane hooks embodies the general principles of drop forging.

The crane hook used as an example weighs 8 pounds. In this case only one set of dies is used, but for more complicated pieces two or more sets arranged side by side under the same hammer often are required. The crane hook is made from a ¾ x 4-inch steel bar, which is heated to a bright yellow heat in an oil burning oven, and then placed edgewise at the side of the die proper. Here projections on the upper and lower die blocks produce an initial deforming or bending of the bar. This is called edging or breaking down. It causes the shape of the hot bar to conform somewhat to the shape of the dies so that in forging there is less waste material to be trimmed. After edging, the bar is laid in position on the lower die block where it is gradually formed into the required shape. After each blow of the hammer the operator lifts up the piece so as to permit the scale to be blown out of the lower die block. This is an important operation for if scale is left it is forged into the piece making the surface rough and reducing the strength. The scale is blown out by one or more strong blasts of air directed on the die block.

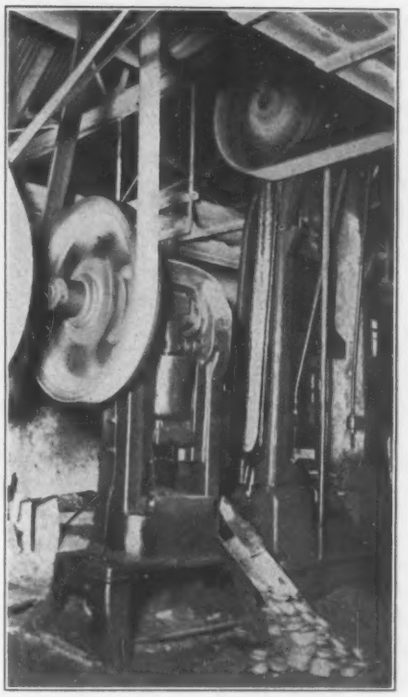


FIG. 6—A BOARD HAMMER AND TRIMMING PUNCH USUALLY ARE ARRANGED IN PAIRS

As the forging progresses the excess metal is squeezed out around the die in a thin fin called the flash. The flash tends to hold the die blocks apart and unless they are specially designed to take care of this extra width of material the flash must be trimmed on a trimming machine and the piece then put back and further forged between the original dies. Such trimming is necessary in the case of the crane hook. The piece is struck six or eight blows with the hammer, is then transferred to a trimming machine where the flash is cut off, is then replaced on the hammer and given two or three additional blows which forces out a new flash. It is then again trimmed and again placed under the hammer for a final straightening and finishing blow. The piece is then cut off from the rest of the bar in a shearing machine and the operation is repeated.

Sometimes small pieces are not trimmed by the hammer operator at all, but are thrown from the hammer into a container and later carried

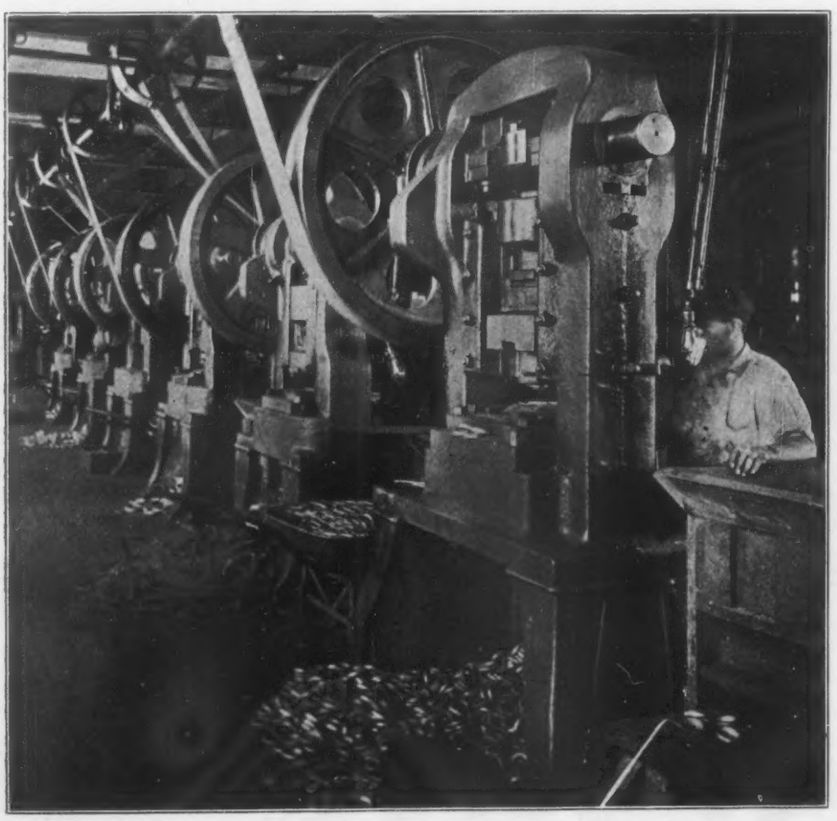


FIG. 5—A BATTERY OF DROP HAMMERS IN A MODERN FORGE PLANT

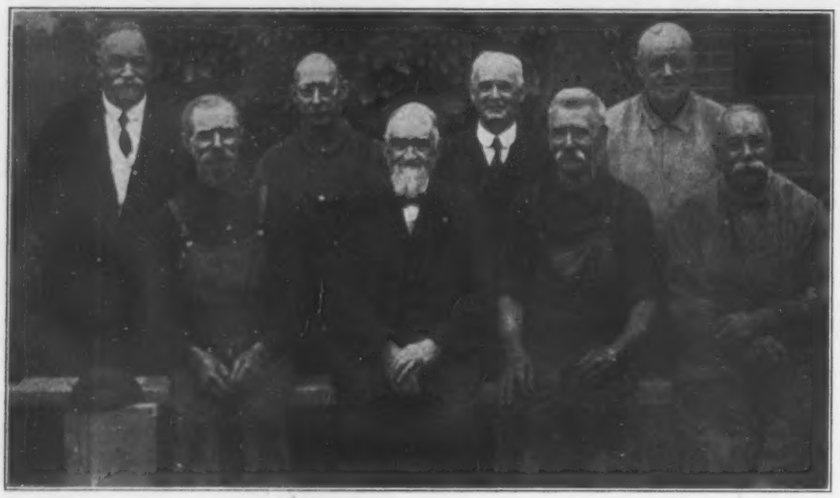


FIG. 7—A GROUP OF PIONEERS IN THE CONNECTICUT FORGING INDUSTRY

to a trimming room where the flash is trimmed off cold. In some cases the hammer operator throws the forged pieces down near a second operator who picks them up and puts them through a trimmer.

As has been mentioned the design of dies has a great deal to do with the method of forging. The flash which runs under the blows of the hammer, being thin, cools quickly and, therefore, requires more work for its further flattening than does the hotter metal in the die proper. To overcome this dies are usually made with what is known as a gutter to take the excess metal. With this design of die it is possible to allow for the thickness of the flash in the depth of the die impression and thus to do away with the necessity of trimming more than once.

In order to work properly all sides of a die for drop forging must have draft of at least 7 degrees. This is the chief limiting factor in the producing of small pieces by drop forging. Some extremely complicated pieces have been produced by drop forging and often the ingenuity of the diemaker overcomes obstacles which at first seem insurmountable because of having to maintain sufficient draft.

Die Making Is Important

The diemaking department usually is a well equipped machine shop with lathes, drills, special shaping machines and other tools. The machining and finishing of a set of complicated dies may take two or three weeks, while the actual work performed by the set in conjunction with the hammer may be done in two or three days. The cost of making dies usually is distributed over the first order for the completed part. Thus if a thousand pieces are ordered the price per piece includes 1/1000 of the die cost. This enables the manufacturer to quote a lower price per piece on repeat orders.

Plan Convention Program

The American Institute of Steel Construction will hold its annual meeting at the William Penn hotel, Pittsburgh, Jan. 23-24. Careful attention will be given to framing future policies of the organization, and an effort will be made to further extend the adoption of the institute's standard specifications. The program will be well rounded out by addresses concerning economic and general business problems. The annual banquet will be held on the evening of Jan. 23. An invitation has been extended to all interested, whether members of the institute or not. Official programs and further details may be obtained shortly by addressing Charles F. Abbott, executive director of the institute, 350 Madison avenue, New York.

Inspect New Precipitator on Colorado Stack

On Dec. 17 and 18 a party of engineers visited the new electrical precipitator installed by the Colorado Fuel & Iron Co. to clean blast furnace gas. This cleaner installed on one stove, is the first of a battery to be later completed to clean the gas from two of the furnaces at the Colorado plant.

The engineers who traveled from the east in this party were D. B. Baird, superintendent of blast furnaces, Steubenville works, Wheeling Steel Corp., Steubenville, O.; D. Eppelsheimer, consulting engineer, American Rolling Mill Co., Middletown, O.; N. H. Gellert, president Gellert Engineering Co., Philadelphia; W. H. Oldham, superintendent of blast furnaces, Tennessee Coal, Iron & Railroad Co., Ensley, Ala.; and P. G. Wilander, superintendent of blast furnaces, Wheeling Steel Corp., Portsmouth, O. The party was met at Pueblo by another group of engineers representing the Empire Zinc Co., Canon City, Colo., a subsidiary of the New Jersey Zinc Co. This party consisted of R. S. Beall, Thorton Beall, Otto Fagerstown and F. E. Riede.

The management of the Colorado Fuel & Iron Co. entertained the visitors at a Rotary club luncheon and

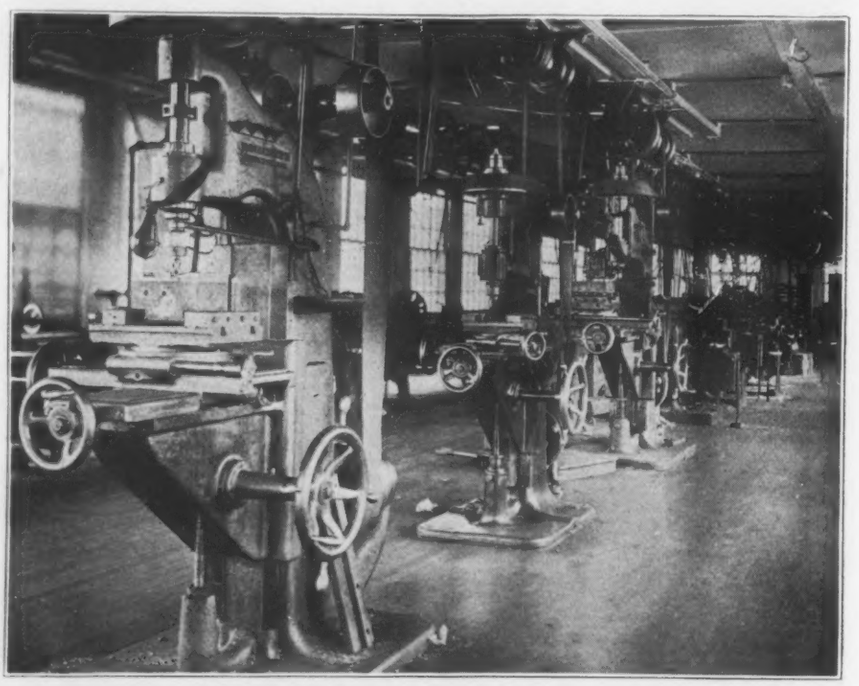


FIG. 8—DIEMAKING REQUIRES EXTENSIVE MACHINE TOOL EQUIPMENT

at a banquet especially given in their honor by the Pueblo Society of Engineers. Following the banquet, N. H. Gellert presented a paper on "Removing Dust from Blast Furnace Gas" after which the meeting was open to discussion.

An inspection of the electrical precipitator showed it worked satisfactorily and most of the time is cleaning the gas to two-tenths and less of a grain per cubic foot. There has been a saving of 20 per cent in the gas used per stove since the precipitator has been running. The company is getting six tons of dust of a fine nature from this one electrical cleaning unit and as six will be used on a furnace it is expected that 36 tons of dust will be recovered from the gas issuing from each furnace.

H. W. Neblett is in charge of the precipitation work at the plant, under Wilfred Sykes, consulting engineer of the Colorado company. The electrical cleaning plant was designed by the Gellert Engineering Co.

Standardization an Asset to Germany

STANDARDIZATION of industrial production has been one of the important factors in enabling Germany to maintain its industrial machine intact, in the face of the multitude of obstacles now confronting that country. This statement was made in a bulletin just issued by the American engineering standards committee, 29 West Thirty-ninth street, New York.

"The extent to which Germany has so far succeeded in keeping her industrial machine intact, is due in no small part to the elaborate scale on which her standardization work is performed," it is stated in the bulletin, which was prepared by Dr. P. G. Agnew, secretary of the American engineering standards committee, who recently returned from Europe, where for two months he made a study of the standardization movement and the manner in which European developments in this direction are likely to affect American industry. The elaborateness of the organization for the work, its activity, and the scale on which it is being carried out constitute a new development in industrial organization.

"Practically every important manufacturing concern in Germany is participating officially in the industrial standardization program of that country. More than a thousand German companies have formed standardization organizations within their own works. These organizations are called 'standards bureaus.' The larger companies have branch bureaus in the separate departments, or in the separate factories. One of the well-known companies has 21 such branch bureaus, employing in all a special staff of more than 100. Another firm has a permanent full-time staff of over 200 in its various branch bureaus. In all of the great companies the bureau reports directly to the general manager."

The extent to which industrial life in Germany has been co-ordinated, it is stated, is shown by the fact that more than 700 German national standards have been adopted. This includes only those in which several different industries are concerned, and which are approved by the central national body. These include fundamental engineering standards as: Standard diameters, tapers, sizes of keys, threads, fits; materials; tools; measuring instruments and gages; machine parts, including handles, ball and journal bearings; gears; and sizes of paper.

In addition to this work of the central body, and closely correlated with it are no less than 65 special industry committees actively working on such subjects as: Standardization of pipe fittings, piping and accessories; welding; steel construction; concrete and reinforced concrete; fire fighting equipment; windows, doors and stairways; foundry practice; printing trades; merchant marine; locomotives; motor trucks; laboratory apparatus; photographic supplies; nonferrous metals; precision tools; sand, gravel and street paving material; typewriters; highway bridges; rolling mills; and railway car construction.

Locomotives Are Standardized

A striking example is cited of the efficiency of national standardization as it has been developed in Germany, in the case of a rush order placed with German manufacturers for 200 locomotives for delivery to Russia. Production of different parts was allotted to 17 different manufacturers to be produced strictly upon the plan of interchangeable parts, no one manufacturer making a complete locomotive. No serious practical difficulty was encountered in filling the order. The inspectors made a particularly striking test of the feasibility and accuracy of the plan by ordering a complete locomotive to be assembled from parts chosen at random from the parts furnished by the 17 manufacturers. It proved to be ready for service immediately after assembly without the necessity of any disassembling for readjustment.

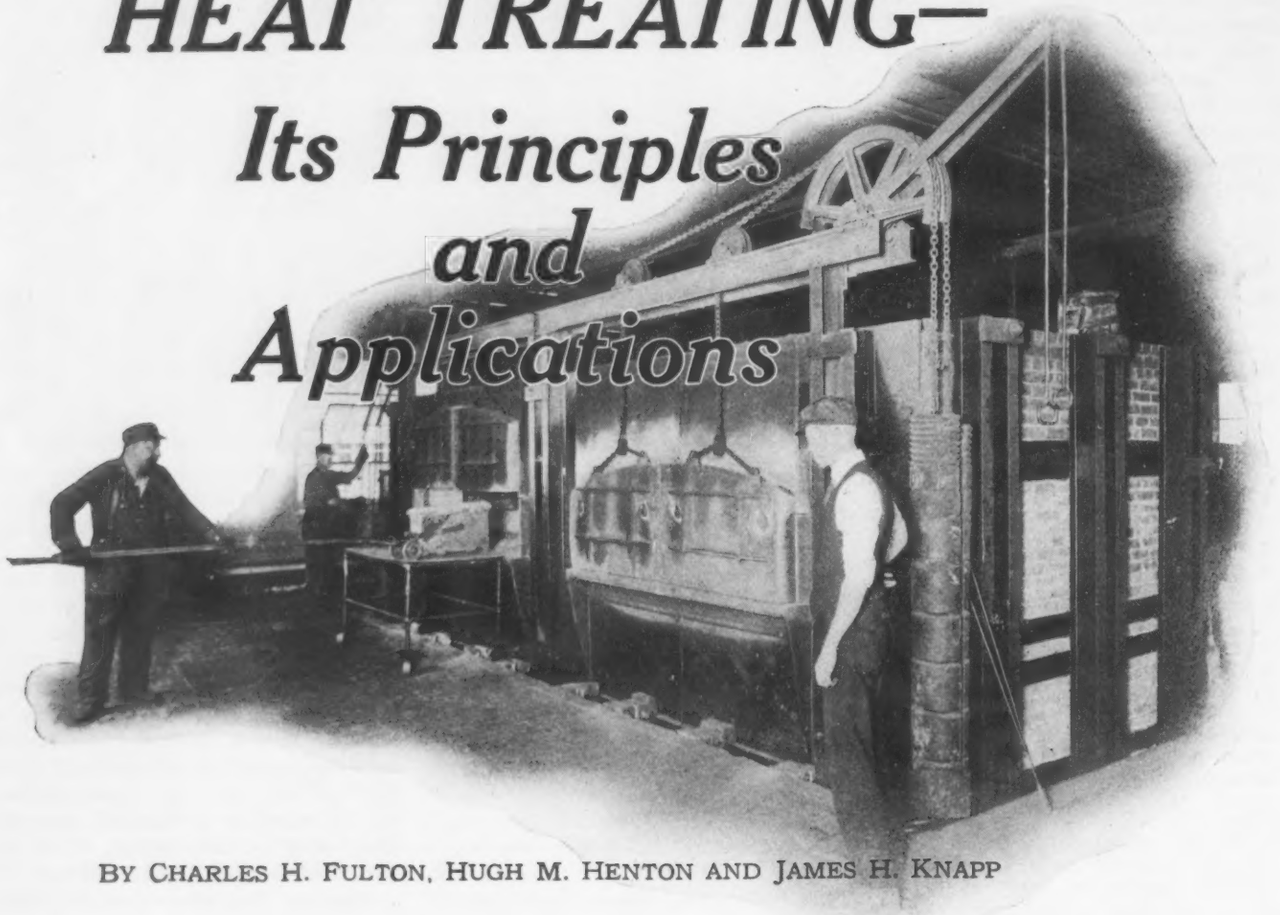
Standardization engineering now is a recognized profession in Germany. The rapid development of standardization organizations within the companies has made a large demand for such work. Advertisements for standardization engineers and for such positions regularly appear in the engineering press.

An interesting development of the last few years is the appearance of consulting engineering agencies specializing in standardization work. There are now five such organizations in Germany. This work is closely connected with industrial or efficiency engineering, in which there is now great and growing interest in Germany. In general, it appears to be much more closely connected with the movement for industrial standardization than is the case in this country. The largest of these organizations devotes about half of its time to standardization work, employing a staff of over 40. They have as their clients, trade associations as well as individual organizations, the latter including both large and small companies.

One of their clients is the trade association representing the motor vehicle industry. In this work they perform many of the services that would be done by an ordinary headquarters standardization staff. Of the companies which are their clients, some maintain their own standards bureaus, which take care of the greater part of the detailed work, leaving to the consulting agency only the more important and difficult questions. In other cases, the consulting company does a large amount of the detailed work.

Another most interesting development is the work of consulting engineers on trade catalogs for companies. This is particularly significant, as it is carrying standardization a step farther than is usual, by introducing it into the sales organization and sales policy. In this, careful consideration is given to the question of limiting the number of types, ranges and sizes offered for sale, placing proper emphasis in the catalog on these particular items on which the company wishes to concentrate, and, in general, in featuring and often advertising the relation to the company's products to the standardization movement.

HEAT TREATING—
Its Principles and Applications



BY CHARLES H. FULTON, HUGH M. HENTON AND JAMES H. KNAPP

Chapter IV—Heat Treating in General (Complete in this Issue)

THE object of the heat treatment of steel, whatever the particular form it may take, is to attain such physical properties as are best adapted for the use to which it is put. In order to obtain the benefits of heat treatment, it is necessary to have steel of suitable chemical composition and of good quality.

The choice of the proper steel is highly important. For example, in making a gear used in the transmission of an automobile, where great strength and toughness of body combined with a very hard wearing surface of the teeth will be required, it is evident we would not select a high-carbon tool steel, which in itself, even in the unhardened state is quite brittle. We would select a carbon steel of relatively low-carbon content or a low-carbon nickel steel, forge it into the proper gear, then carbonize the exterior so as to get a hard-wearing surface combined with a strong tough body, and then suitably heat treat in order to bring out to the greatest possible degree the physical properties wanted.

The foundation of successful heat treatment is in the selection of the proper type of steel and in the uniform quality and grade of this steel. It is evident from what has gone before that the composition, particularly the carbon content, plays an important part in the temperature regulation of heat treatment and if, in the heat treatment of a large number of parts by any standardized method, composition of these parts should vary within relatively wide limits, the results obtained from the heat treatment would be far from satisfactory, since the method of procedure for a certain composition will not answer for that of another composition.

Steel Must Be Uniform

Therefore, the uniformity of the steel to be heat treated is of the utmost importance. Analysis may show a certain lot of steel to be fulfilling specifications as to uniformity of composition and still the steel may be of poor quality. Sometimes this is due to irregularities in manufacture which cause a harmful segregation of impurities and foreign substances within the steel, or it may be due to the presence of cavities, blow holes, and cracks. For this reason there should be a physical inspection directed toward revealing such nonuniformity of structure.

Tiemann defines heat treatment as follows: Heat treatment is the change or the series of changes in temperature, and also the rate of change from one temperature to another, brought about to secure certain desired conditions or properties in a metal or alloy.

As discussed in Chapter II, heat treatment affects the physical properties of steel in two ways: First, by controlling the constituents of the steel and, second, by controlling the grain size of the steel.

Heat treating is divided into four main divisions: Annealing; grain refining or heat refining or normalizing; hardening; and tempering or drawing. A fifth division is cementation, carbonizing or case hardening, which although not a part of heat treatment as covered by the above definition, usually is included in the general subject of heat treatment.

Annealing is a reheating operation followed by a slow cooling. The objects of annealing are to completely remove any hardness in the steel, whether this be due to cold work or to the presence

of hard constituents like martensite and related substances, and second, to remove strains which may be present, due to too rapid cooling, particularly if the piece is irregular in shape so that the cooling has been uneven throughout the piece. It is applied to steel castings of all sizes and shapes and to forgings of many types, to remove cooling strains, and put them into the best grain condition and to any part, cast or forged, which is to be machined, and hence must be in a soft and ductile state. In the annealing of steel the reheating may be carried to near the lower critical point but not above it, which will result in the removal of all strains due to uneven cooling, and will also remove the hardness due to certain constituents like martensite, troostite or sorbite, that may be present from rapid cooling. In effect, such a reheating is a complete tempering or drawing operation. It has no influence on the grain size, and simply puts the steel into the soft pearlite condition. The cooling from this reheating should be slow in order not to set up strains due to uneven rapid cooling. The cooling usually is carried out in the furnace, and in case the parts are small they may be packed in cases in lime or similar inert material to prevent the formation of scale during cooling. Holding the steel at a temperature near the lower critical point for an extended period causes coarsening in the structure, as then ample opportunity is given for the coalescence of ferrite with ferrite and cementite with cementite within the pearlite, and a coarsening of the ferrite network structure. This leads to an increased softness, sometimes desirable for machining, but undesirable from the standpoint of strength.

Grain Refining

The reheating temperature may be carried into the critical range or slightly above it, in which case there is a complete change in structure again as has been fully set forth in the previous chapters. Grain refining takes place in this range of heating, the exact temperature of reheating depending on the carbon content, as this determines the position of the critical points. If a fine grain conferring maximum ductility combined with strength is desired, the steel should be cooled rapidly, which preserves the fine-grain structure, and then be reheated rapidly to 500-600 degrees Cent., which is well below the lower critical point. The cooling from this last reheating should be fairly rapid but not so rapid as to set up cooling strains. In some instances the cooling after the first reheating is in fact a quenching in water or oil so that the steel, after this treatment, is in the hardened state. The second reheating then completely draws the steel and leaves it in a fine-grained pearlitic condition. The form of annealing in which the steel is heated above the upper critical point and held there for some little time to obtain equilibrium conditions and fine grain, and then cooled fairly rapidly in air without a second reheating to just below the lower critical point, is called normalizing. It is carried out for the purpose of putting the steel into a uniform condition, removing coarse grain, due to high initial finishing temperature and strain due to uneven cooling. The rate of cooling in air through the critical range in this case determines the final structure. If the cooling is rapid the steel may be sorbitic; if slow, it will be pearlitic. The rate of cooling in air below the critical point A_1 will have no effect on the structure of the steel. Annealing and normalizing, the effect of mass and other factors and the furnaces used will be discussed in Chapter V. These subjects also are covered in "Recommended Practice for Annealing," A. S. T. M. Standards, 1918, pp. 328, 334.

In annealing and normalizing, the object is to obtain the physical properties of the soft or pearlitic state of steel. In the treatment for hardening and tempering the object is to obtain steel in the hardened or semihardened state, but free from strains and cracks which are a natural result of the rapid cooling necessary to produce the hard state. The underlying principles which govern the production of the hard constituents of steel, martensite, troostite and sorbite, have been described in the last two chapters. It is sufficient here to state that the preservation at room temperature of these constituents, which are really normal only at the higher temperatures is dependent upon a rapid rate of cooling from a certain critical temperature range, which varies with the percentage of carbon and special alloying elements in the steel. This rapid cooling is technically termed quenching and it is carried out by plunging the steel parts, heated to the proper temperature, into a liquid quenching bath such as water, oil, molten lead, or certain molten salts. The particular temperature above the lower critical point from which the steel is quenched, the size and shape of the piece as influencing rate of cooling, and the severity or rapidity with which it is quenched determine what constituents are preserved. The rate of cooling is determined by the size and shape of piece and the nature and temperature of the quenching medium. Water, on account of its high specific heat has great capacity for absorbing heat, and affects a rapid cooling; suitable oils, with a lesser specific heat and lower conductivity, give a slower cooling; and lead, with a high conductivity but low specific heat and hence low heat capacity, in connection with the relatively high temperature at which it must necessarily be used, gives a still slower cooling. Hence, when the hardest state (martensite only) is desired, the steel is quenched in cold water from somewhat above the upper critical point of that particular steel. However, if a martensite, troostite and ferrite mixture is desired, the material is quenched in oil from within the upper critical range. The object of heat treatment is not the production of these constituents in themselves, but rather the physical properties which are inherent in these constituents. Since most solid bodies expand with increasing temperature and contract with decreasing temperature, which expansion and contraction take a certain amount of time, it is evident that a rapid cooling which practically arrests contraction, will set up internal stresses in the body, which will lead to strains or deformations that manifest themselves in the form of checks or cracks. The more rapid the cooling the more pronounced is this effect.

Cooling Steel Complex

The behavior of steel under heating and cooling is rather complex. Heating involves more than expansion with increasing volume and hence a lesser density and conversely cooling involves more than contraction, or shrinking, with a decrease of volume, and hence a higher density. This is because in the case of steel the volume changes inci-

Outlining Various Heat Treating Operations

HAVING explained the structure of iron and steel and discussed its relation to the physical properties of these materials, the authors in the accompanying chapter begin to deal with the application of the principles laid down in previous chapters. This is done by reviewing heat treating in general, showing the function of annealing and normalizing, grain refining, hardening and tempering, tempering or drawing and case hardening, and tracing the relation of each operation to the others. Chapter V, dealing with normalizing and annealing in detail, will begin the issue of Jan. 24.

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dent to the transformation of *gamma* to *beta* to *alpha* iron play their part. With a falling temperature this change is accompanied by an expansion, hence an increase of volume and a decrease in density, which, of course, is directly opposite to the contraction or increase in density that takes place in the metal due to cooling in other ranges of temperature than the critical range.

Stresses Form on Cooling

An illustration will serve to make this clearer. If a piece of relatively large cross section is heated to above the critical points and then allowed to cool, it will not cool uniformly throughout the mass, but as the loss of heat is from the surface, the exterior will be at a lower temperature than the interior. If it be cooled so that the exterior is just below the lower critical point but the interior still is above the upper critical point (which is relatively easy with 0.7 to 0.8 per cent carbon steel) the exterior layer will be pearlite and have contracted due to falling temperature and also expanded due to the change from *gamma* to *alpha* iron. Therefore, in cooling from say 800 to just below 700 degrees Cent., the actual contraction has been nothing or zero. The untransformed interior will be at 800 degrees when the exterior is just below 700 degrees and hence at the same volume. But now as the exterior cools to 600 degrees, it will contract and as the interior cools to 700 degrees at the change from *gamma* to *beta* to *alpha* iron it will suddenly expand, so that there is an expanding core within a contracting shell. This sets up great internal stresses and if these be great enough rupture will take place with the formation of cracks and checks. If the cooling be slow, as in annealing, the metal is more or less plastic and adjustments can readily take place. The stress is released and cracks do not form, or the tendency to rupture is removed. But if the piece is suddenly cooled as in quenching, this stress is not released and strain is present. Pearlite does not form when quenching is from above the critical range, but during the quenching *gamma* iron is transformed suddenly into *beta* iron in the martensite and partly into *alpha* iron so that dilation or expansion takes place within the piece. This is in addition to the greater contraction of the rapidly cooled exterior layers as against the more slowly contracting interior layers due to ordinary dilation and contraction with heating or cooling.

The play of these forces is illustrated by the well known fact that a short cylindrical piece of steel will on repeated heating and quenchings assume a spherical shape. Practically all pieces on quenching are distorted, the distortion depending largely on the shape of the piece. The density and volume of a piece after quenching is not the same as before quenching.

If a gear, for example, is annealed and then machined and cut to form and then is reheated and hardened by quenching the dimensions, even when the distortion due to quenching is disregarded, are not the same. Quenched steel is less dense and has greater volume than annealed steel; therefore, the quenched gear will be larger in certain directions than the gear before quenching. It usually has greater width and a somewhat lesser diameter.

Reconciling Scientific and Shop Terms

IN THIS chapter the terms annealing, normalizing, grain refining, spheroidizing, hardening, tempering, and drawing have been given definite meanings, based on the scientific discussion detailed in the previous chapters. In industry, in the shop and works, there originates a terminology which is sanctioned by common use and is expressive of certain procedures and operations. This terminology is very useful but in some instances is ambiguous and insufficiently concise to scientifically express proper meaning. It follows, therefore, that some who are familiar with the works terms may not on first thought agree with the definitions used in this chapter. In order to reconcile the different understandings of the terms used, the summary appearing on the opposite page has been suggested by M. E. Gere, New Departure Mfg. Co., Bristol, Conn.

—THE AUTHORS.

Quenching in water gives a greater density than quenching in oil. The density is less and the volume greater for a quenched piece, the higher the temperature within the critical range from which the piece is quenched. In heat treating certain steel parts, such as gears that must fit a shaft and which are machined, carbonized and quenched to obtain a hard surface and tough core, the first quenching after carbonizing is quite severe, after which the pieces are reheated to the proper temperature within the critical range, steel plugs of the sizes of the shaft inserted into the openings of the gears, which at this temperature are larger than the plugs, and the piece quenched in oil. The quenching shrinks the hole to the size of the plug, which is removed by strongly tapping with a hammer. The size of the hole depends upon the quenching temperature; the higher this is the larger will be the hole.

Quenching is followed by the tempering or drawing operation in order to remove strain and to give the steel the final proper constitution and physical properties and which is discussed below. The drawing, which is a step toward annealing causes a shrinkage or contraction of volume, and hence an increased density, which must also be taken into account in determining the final size and dimensions of the piece.

The foregoing statements on the subject of volume changes in steel on quenching illustrate the general complexity of the problem of that part of the heat treatment which has to do with the hardening of steel. The practice followed to obtain sound hardened steel varies with the importance of the piece and the use to which it is put. In some instances, hardness only is required without great strength; in others, hardness and strength must be combined, and again slight distortions on quenching may be unimportant while in others the final quenched form must be true. The particular heat treatment, therefore, has to be worked out in each individual case.

Selecting Quenching Mediums

The most common quenching medium is oil, because by its use the quenching is not as harsh as with water. Various types of oil are used, fish oils, lard oils, and mineral oils of different specific gravities being the most common. There is no particular virtue in any one oil. It must have a relatively high flash point and boiling point so as not to take fire when the hot steel is plunged into it and it must have relatively good conducting power and capacity for absorbing heat. Light oils effect a more rapid cooling than heavy oils. The particular type of oil to be used depends upon the degree of quenching desired and also on the size and shape of the piece. A small thin piece when put into the quenching liquid loses heat much more rapidly than a large thick piece. Since the rate of loss of heat is the factor that determines the structure, it is evident that the cooling of a small thin piece in air may give the same structure as that of the large piece quenched in oil; and again a large piece quenched in thin oil may have the same structure as the small piece quenched in thick oil. The lighter oils have a tendency to form a vapor coat immediately around the hot steel piece when it is plunged. This vapor is a poor conductor of heat and, therefore, retards cooling. This formation of vapor is also pronounced in water quenching in which the piece will be surrounded by an envelope of steam which retards cooling. For this reason in

water quenching it is desirable to have a large circulating bath in order to keep the temperature of the water down and to have the water move around and about the piece of steel preventing the steam envelope. The rate of cooling also is determined by the temperature of the quenching bath. For example, quenching in warm water or warm oil will not give the same structure as quenching in cold water or oil. However, the effect of temperature of the quenching bath is much more pronounced in the case of water than with oil, for as water boils at 100 degrees Cent., the tendency to form a steam envelope around the piece is noticeably increased as the temperature of the water rises.

In tempering or drawing after hardening by quenching, the piece is reheated to a relatively low temperature in order to release strains due to quenching and also to permit the formation of the proper structure within the steel. The reheating usually is low. In some instances the reheating is combined with quenching. For example, in place of quenching in cold water or oil and then reheating the piece in hot oil at a certain temperature, the piece is quenched in hot oil and the tempering and drawing operation as a distinct operation is omitted, the quenching and drawing being practically combined in the method. Such a treatment sometimes is termed oil tempering when carried out in oil, and lead tempering when the piece is quenched in molten lead, but these terms are misleading, since tempering or drawing, which is the release of hardness, must always be preceded by hardening.

Heating steel parts preliminary to quenching must be carried out slowly and uniformly to avoid strains during heating and to insure a thoroughly uniform temperature throughout the piece in preparation for quenching. Heating is carried out in suitably designed furnaces, burning either oil or gas, or heated electrically. Such furnaces are described in a later chapter.

Steel parts, particularly small parts also may be heated in heating baths, such as molten lead or certain molten baths. Lead melts at 327 degrees Cent. and may be heated well toward 800 degrees Cent. without forming much vapor. The molten lead is contained in covered tank furnaces and kept at the proper temperature by oil or gas burners. Temperature control is obtained by pyrometers. The high conductivity of lead offers a good means for the rapid transfer of heat and results in the rapid uniform heating of the immersed parts. A difficulty with lead is its great specific gravity, causing the steel parts to float. In some cases means must be adopted to hold the parts beneath the lead. Another difficulty with lead is that it oxidizes quite rapidly to form a litharge scum on the surface; this tendency is overcome by keeping it covered with a layer of fine charcoal or coke. Lead also tends to stick to the steel, particularly to such parts as screw threads. Heating baths frequently are employed for reheating machine finished bright parts which if heated in furnaces would become coated with an oxide scale. When reheated in lead or salts, the oxidation or scale formation is prevented and the part stays bright. Salt baths consisting of mixtures in certain proportions of sodium chloride or common salt and potassium chloride are used. Sodium chloride is molten at 802 degrees Cent. and potassium chloride at 780 degrees Cent. By a proper mixture of the two consisting of approximately 42 per cent sodium chloride, and 58 per cent potassium chloride, the melting point is lowered to 664 degrees Cent. so that such a bath can be used from 680 upward to well above 900 degrees Cent. without difficulty. The gravity of such a salt bath is lower than that of steel so that the pieces sink to the bottom of the bath. On withdrawing the reheated pieces from the bath, they will be covered with a thin layer of salt which effectively protects them against scaling as they are transferred from the reheating bath to the drawing or tempering oil bath.

The operation of tempering or drawing which follows hardening by quenching already has been briefly mentioned. It is a reheating operation which releases the strain caused by quenching. It almost

A Summary of Terms Used in Heat Treating

EVERY heat treatment, by whatever name it may be called, is either a hardening or a softening of the metal compared with its last state at room temperature. Every change of state creates a new set of physical properties which are associated with at least a slight change in hardness, i. e., the metal is either harder or softer than it was.

ANNEALING is any reheating to and cooling from the Ac_1 critical point whereby an amount of pearlite is formed greater than existed in the previous state. A piece of steel is fully and truly annealed when it contains at room temperature the maximum possible amount of true pearlite indicated by its analysis. This state can be obtained only by slow cooling from above the critical point.

It is understood that truly annealed steel may or may not be in the best condition for commercial purposes. If it is not, many combinations of treatments which may include grain refining, normalizing, spheroidizing, hardening, and drawing may be used to obtain the desired property. This combination of treatments is sometimes called annealing by the layman but the professional heat-treater with technical knowledge will differentiate the treatments.

NORMALIZING is any reheating to and cooling from the Ac_3 or the Acm critical point for hypo and hyper-eutectoid steels respectively, whereby an amount of sorbite is formed greater than existed in the previous state. Complete normalizing calls for the maximum granulation of the carbides (sorbite).

SPHEROIDIZING is any reheating in above the Ac_1 critical point whereby sorbitic granulations of carbide become or tend to become spheres. It requires a long holding at the proper temperature for completion. It is rarely applied commercially except to eutectoid or hyper-eutectoid steels. Spheroidizing would be much more used if better understood.

HARDENING is any reheating to and cooling from above the Ac_3 critical point whereby an amount of solid solution either austenite, martensite or troostite is formed and retained in an amount greater than that contained in the previous state. The maximum hardness is attained when martensite only is present.

TEMPERING is any reheating to under the Ac_1 critical point whereby strains are relieved but which does not produce a change in the microscopic constituents.

DRAWING is any reheating to under the Ac_1 critical point whereby a partial or complete transformation of any or all of the microscopic constituents takes place, such as austenite to martensite or martensite to troostite or troostite to sorbite. The maximum drawing gives rise to a wholly sorbitic structure.

invariably is carried out after the quenching, for the quenched or fully hardened pieces are rarely in a physical condition fit for use. Tempering or drawing in reality is the beginning of an annealing operation and aside from the relief of the strain, causes a change of structure. If the steel has been quenched from the upper critical point it will be composed of martensite. Reheating this martensite transforms it progressively, first into troostite plus ferrite; second, the troostite into sorbite and third, the sorbite into pearlite. This last transformation requires a reheating to near the lower critical point. The tempering or drawing therefore is a reheating to a relatively low temperature only. Most tempering or drawing is carried out between temperatures of 220 and 400 degrees Cent. which gives for the lower temperatures, troostite, and for the higher temperatures, sorbite. The effect of the drawing temperature depends upon the original hardness of the piece. If the piece originally was quenched from above the upper critical point drawing to 250 degrees Cent. a different structure results than if the piece originally was quenched from within the critical range. In the first case the piece consisted of martensite and the tempering produced a certain amount of troostite. In the second case the quenched piece contained martensite, troosite and ferrite, and the tempering changed some of the martensite into troostite, so that the total amount of troostite is greater than in the first case and the physical properties are different. The drawing temperature therefore is accurately adjusted to the physical properties required in the steel.

Tempering and drawing is carried out in baths of oil, lead or certain low melting salts, like mixtures of sodium and potassium nitrate. In design the baths are practically like heating baths. The most common medium for tempering or drawing is mineral oil of a high flash point. Oils with a flash point of about 320 degrees Cent. may be used for drawing temperatures as high as 260 degrees Cent. When higher drawing temperatures are necessary salt and lead baths must be used. Electric heating furnaces are growing in favor for this purpose.

Gears, camshafts, certain bolts and pins, dies and many other steel parts require a strong tough structure, combined with a hard wearing surface. The hard wearing surface is readily obtained by using a steel of relatively high carbon content, but this in the hardened condition is brittle so that the requirement of strength combined with toughness is not met. It is well known that iron or steel when heated in contact with fine charcoal, or other carbonaceous material, or directly with gases like carbon monoxide, or hydrocarbons at temperatures ranging between 850 to 1100 degrees Cent. absorb carbon and form austenite. This action takes place from outside inward, the carbon diffusing gradually throughout the piece. The higher the temperature the more rapid is the absorption of the carbon. The scientific term for this phenomenon is cementation, and its application for the purpose of production of a high carbon shell or case on a relatively soft steel core is known as carbonizing. carburizing or case hardening. In a carbonized piece the carbon content, as would be expected, is highest at the surface and decreases toward the core. When the steel is heated in contact with the carbonizing material for a short time, as for 15 to 20 hours, this increased carbon is found practically all in a shell or case; the actual depth of carbonization or the penetration is small. In many instances the microscope will show four distinct zones in the case: First, unacted-on steel adjoining the core; second, zone in which the steel gradually approaches the eutectoid composition (0.9 per cent carbon); third, zone of eutectoid steel; fourth, a zone of hyper-eutectoid composition (more than 0.9 per cent carbon) which on cooling shows the presence of free excess cementite. The exterior part of the shell may be so high in carbon that the steel even after quenching may contain free cementite, in fact may have passed into the range of white cast iron. Such high cementation is not desirable.

Case Hardening

Carbonizing or case hardening, therefore, affords a means by which a case of high carbon steel can be put on a core of low carbon (0.15 to 0.25 per cent) steel. Quenching from above the critical range produces a steel of a hard surface with a tough strong body. The carbonaceous material that furnishes the carbon for the shell or case is called the cement. The cement may be, first, a gas such as carbon monoxide, or a mixture of carbon monoxide and hydrocarbons like illuminating gas, or a hydrocarbon gas alone; second a liquid, like molten potassium-sodium cyanide, mixtures of this with ferro and ferricyanide; and third, solids, in a crushed fine granular condition, like wood charcoal, a mixture of wood charcoal and barium carbonate; bone dust; charred leather, horns or hoofs; coke saturated with mineral oil, and other carbonaceous materials. In the case of solid cements the active agent without question is probably the carbon monoxide gas which is formed during the heating. For example in heating steel imbedded in fine charcoal, the oxygen of the air included within the material forms carbon monoxide with charcoal. This carbon monoxide is decomposed within the extreme surface layer of the steel, with the deposition of fine particles of carbon, which go into solution in the iron, as iron carbide and then diffuse inward toward the core. The other product of the decomposition of the carbon monoxide is carbon dioxide gas, which in turn is converted into carbon monoxide again by the action of the hot charcoal. There also is an action by carbon direct, though not comparable to that of the carbon monoxide. A great variety of solid cements or carbonizing compounds are on the market, most of them being granular mixtures, to which chemicals like ferrocyanide sometimes are added to speed the carbonizing action. The usual temperatures of carbonization range from 845 to 960 degrees Cent. Higher temperatures than this give rapid carbonization, especially if used in connection with quick acting or rapid cements, which results in a shell or case in which the carbon is highly concentrated in the exterior of the case. The carbon content of the case is 1.5 to 2.0 per cent or more. This is undesirable, as distinct layers will occur.

The time of carbonization depends upon the depth of case desired. This may vary from a few thousandths of an inch in the superficial hardening up to 0.10-inch for the deeper cases. The time also varies with the depth of case from two or three hours to 20 and 24 hours. Greater time than the last adds greatly to the cost, on account of the high fuel consumption which is a factor of the time. The actual temperature of carbonization for a given steel depends upon the carbon content as influencing the upper critical point. The temperature usually is about 100 degrees Fahr. above the upper critical point. The steel parts to be carbonized are carefully packed with the cement in the carbonizing boxes, care being taken to see that each metal part is so placed that no sagging or distortion can take place. A cover then is luted on with fire clay and the boxes placed in the furnace, the heat slowly brought up to about 700 degrees Cent. (1300 degrees Fahr.) to insure a uniform heating, then more rapidly to the carbonizing temperature, at which it is held for the required time, the temperature being controlled by means of pyrometers. When the material is carbonized, the temperature is lowered to the proper quenching temperature, the cover removed, and the pieces transferred rapidly to the quenching bath, usually oil. The carbonizing temperature is above the upper critical point of the core, and may be decidedly above the upper critical point of the case, on account of its high carbon content. The grain size of the steel, therefore, will have been coarsened, and the case will be coarser than the core.

For objects which must fulfill special requirements a heat treatment after the

(*Concluded on Page* 178)

Designs New Cutting Off Machine

Limited Floor Space Is Required for New Unit Which Cuts Off and Reams Tubing Up to 14 Inches Diameter at the Rate of One a Minute—Automatic Feeding Mechanism Is Provided—Description of Equipment

BY E. W. MIKAELSON

AN ENTIRELY new method of gripping and driving a tube while being cut is presented in a novel design of a tube cutting off machine which recently was built by the Treadwell Engineering Co., Easton, Pa., and installed in the pipe finishing department of the LaBelle Iron Works, Steubenville, O., subsidiary of the Wheeling Steel Corp., Wheeling, W. Va. Urgent need of a machine that would handle the maximum output of a pipe mill and at the same time suit available floor space prompted the development of the new cutting off unit.

Preliminary designs of various types of machines were developed before a conclusion was reached that, on account of the limited floor space, a machine, which would handle the pipe in direct line after it leaves the straightening tables, would be preferred. After careful consideration, therefore, a machine of this type was built under a guarantee that it would cut off both ends of 8-inch standard pipe at the rate of 60 pipes an hour or one per minute. Actual tests conducted in the shops of the Treadwell Engineering Co., proved the machine capable of exceeding this performance by a considerable margin.

The author, E. W. Mikaelson, is chief engineer, Treadwell Engineering Co., Easton, Pa.

Two driving heads, as shown in Figs. 1 and 5, are provided. These are built in halves and open and close to receive and discharge the tube. Each half of the driving head carries half of the main driving gear and each half unit is so mounted that when in a closed position they form one solid member. The driving heads are direct connected through a telescoped shaft to the main drive while individual motors are provided for a rapid traverse of the heads to suit any variation in the length of the tube. Each driving head is equipped with three gripping jaws, one jaw in each head being spring cushioned to compensate for any variation in the diameter of the tube.

Controls are Interlocked

The driving heads are opened and closed by means of an air cylinder which is operated through a solenoid control valve. The latter is interlocked with the main driving motor so that the valve can be operated only when the driving head is in the correct stop position, that is, with the split vertical. The main driving motor is 25 horsepower and has a speed variation of 1:3. The traverse and the feeder motors, which are rated at 12 horsepower each, also are interlocked with the main drive so that when one is in operation the other is cut out and vice versa. By this means, therefore, any possibility of an accident due to carelessness or ignorance on the part of the operator is eliminated entirely; in fact, the principles of safety first have been carried out to the last degree in the development of the equipment.

Each end of the machine is equipped with two cutting off tools which are driven through a friction clutch from the main driving shaft. Any desired feed may be obtained through a nest of change gears, while a spring return is provided so that the tools automatically return to their starting position at the slight turn of a release handle. The method of handling the pipe in and out of the machine together with the method of mounting the heads necessitated the stoppage of the unit always in the same position, namely, with the split vertical. To meet this requirement, therefore, the engineering department of the Electric Controller & Mfg. Co., Cleveland, developed an effective and simple control which stops the machine at the same point regardless

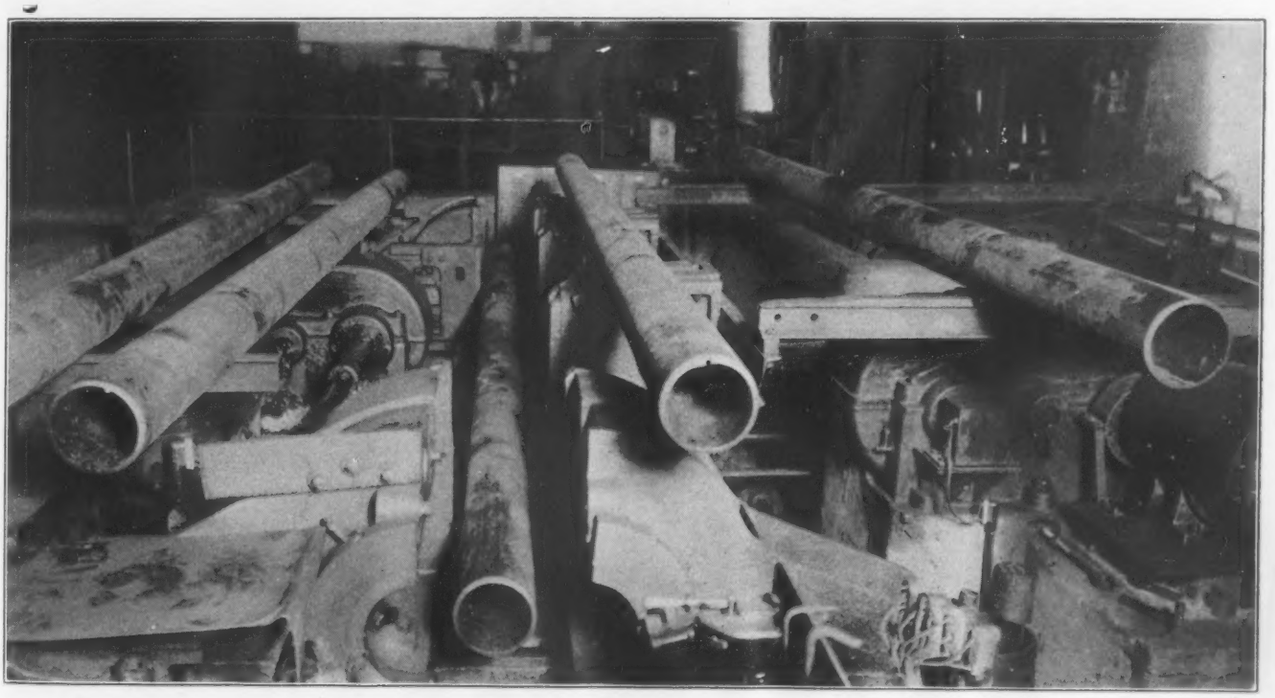


FIG. 1—NEW TYPE CUTTING OFF MACHINE WHICH IS DESIGNED TO HANDLE LAPWELD PIPE 14 INCHES DIAMETER AND IN MAXIMUM LENGTHS OF 25 FEET. THE TUBES ARE LOWERED INTO THE MACHINE FOR A DISTANCE OF ABOUT 2 FEET AS SHOWN

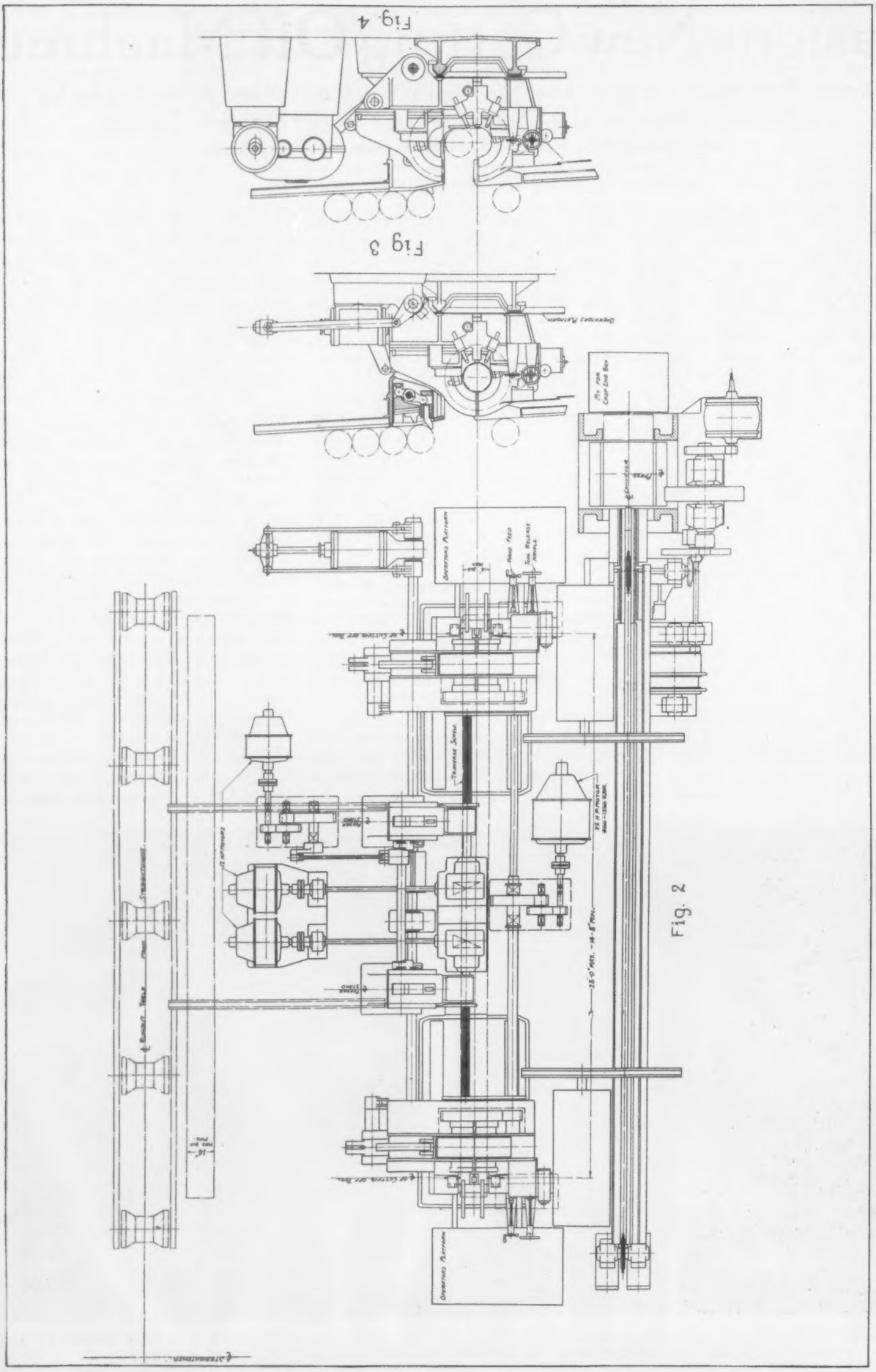


FIG. 2—PLAN OF CUTTING OFF MACHINE AND CROP END PRESS WHICH WILL CUT OFF AND REAM TUBING UP TO 14 INCHES MAXIMUM OUTSIDE DIAMETER AND FROM 14 FEET 8 INCHES TO 25 FEET LONG. FIG. 3—END VIEW SHOWING DRIVING HEAD IN A CLOSED POSITION. THE DRIVING HEADS ON EITHER END OF THE MACHINE ARE OPENED AND CLOSED BY AN AIR CYLINDER OPERATED THROUGH A SOLENOID CONTROL VALVE. FIG. 4—END VIEW SHOWING DRIVING HEADS IN AN OPEN POSITION. INDIVIDUAL MOTORS ARE PROVIDED FOR A RAPID TRAVERSE OF THE HEADS TO SUIT ANY VARIATION IN THE LENGTH OF THE TUBES

of the motor speed or of the position of the driving head at the time the operator turns the control lever. The variations in the stopping point from one time to another never exceeds 1½ degrees.

Hand adjustment also is provided with this hand control to compensate for any variation in operating conditions such as temperature changes within the motor, change in the speed of the motor, etc. An auxiliary push button control of the spring return type also is provided so that the driving heads can be operated at any desired position or can be stopped at any desired position for adjustment of the gripping jaws. The driving head motor is controlled by dynamic braking only, no mechanical or solenoid brakes being used.

How the Feeder Operates

The cutting off machine is located beneath the direct line of travel of the tubes which are lowered into the machine from a distance of about 2 feet. Fig. 6 shows a section through the feeder. The operating principle of the feeding mechanism is unique. By raising the discharge shoe, designated by "A" in Fig. 6, the tube is lifted out of the machine and at the upper end of the stroke rolls onto the discharge skids; during the upward travel of the shoe the front stop finger, designated as "B" in Fig. 6, has been lowered and the incoming tube rolls forward and follows the discharge shoe into the machine. At the same time the front stop finger is lowered, the rear finger is raised and checks the movement of the other tubes. At the downward travel of the discharge shoe the position of the fingers again is reversed and the next tube rolls forward in the entering position.

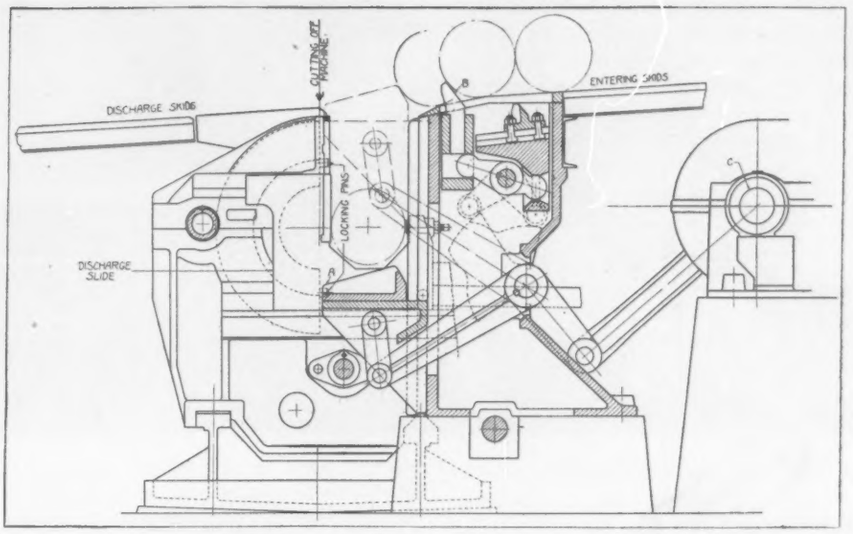


FIG. 6—SECTION THROUGH FEEDER. THE FEEDING OPERATION IS COMPLETED AT ONE TURN OF A CRANK SHAFT AND IS ENTIRELY AUTOMATIC

From the foregoing, therefore, it is obvious that feeding is entirely automatic. The feeding operation is completed at one turn of the crank shaft, designated by "C" in Fig. 6, the actual time required to remove one and insert another tube being less than five seconds. The motor, which operates the feeder, is equipped with a limit switch so that when the operator pushes a button the feeder starts, makes one turn and stops itself.

A crop-end press, which is an integral part of the equipment, is located at one end of the cutting off machine. Operation of this press is entirely automatic. Crop ends of the tube from the rear of the machine are carried by a conveyor to the press into which they are fed and discharged by automatic feeding mechanism. The press is operated by a

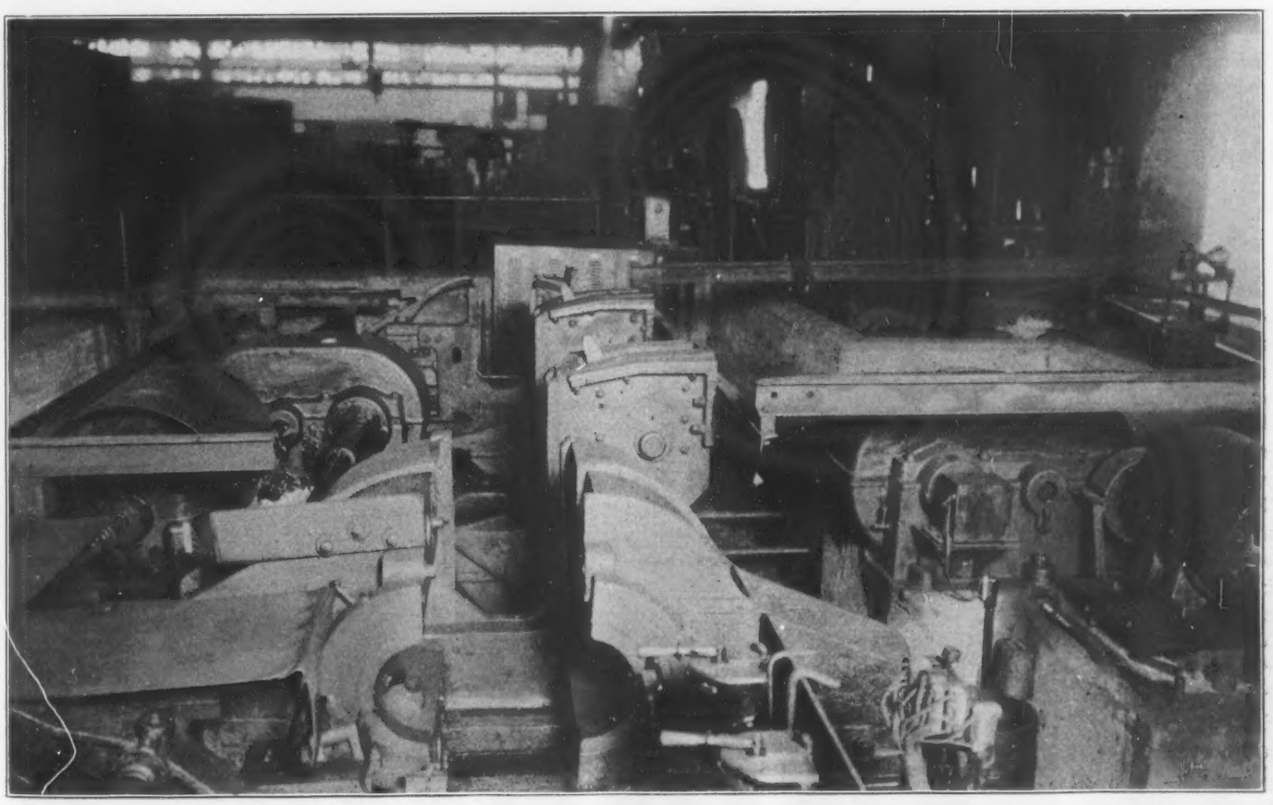
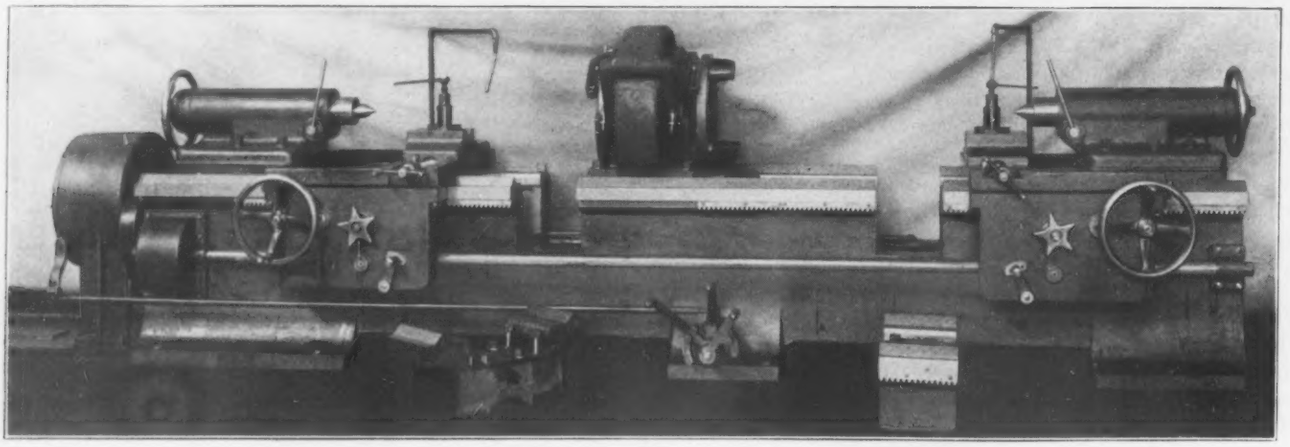


FIG. 5—CUTTING OFF MACHINE WITH DRIVING HEADS IN THE OPENING POSITION. THE MACHINE, WHICH HANDLES THE TUBES AFTER THEY LEAVE THE STRAIGHTENING TABLE IS LOCATED BENEATH THE DIRECT LINE OF TRAVEL OF THE PRODUCT

DRIVING HEADS IN AN OPEN POSITION. INDIVIDUAL MOTORS ARE PROVIDED FOR A RAPID TRAVERSE OF THE HEADS TO SUIT ANY VARIATION IN THE LENGTH OF THE TUBES



COMBINATION JOURNAL TRUING AND AXLE LATHE SHOWING FILLER BLOCKS REMOVED

25-horsepower motor. The press ram is adjustable so that the crop ends can be pressed down flat or to such shape as may be required for inspection.

By locating the driving gears beneath the approach skids the floor space occupied by the entire machine is comparatively small. The skids are built of sufficient length to store from six to ten 12-inch tubes. The machine has a capacity for cutting off and reaming tubing up to 14 inches maximum outside diameter and from 14 feet 8 inches to 25 feet long. The equipment is operated by two workmen stationed one at each end. Since only the two traverse motors can be operated simultaneously the maximum power required when the machine is engaged not including the crop end press, is 25 horsepower. Patents covering all main features of the machine now are pending.

Designs Journal Truing and Axle Lathe

The Betts Machine works of the Consolidated Machine Tool Corp., Rochester, N. Y., has introduced a type of combined journal truing and axle lathe which has a number of changes in design. The lathe is shown in the accompanying illustration.

This machine is furnished with two carriages for turning outside journals with the wheels mounted on the axle. The gaps in the bed for swinging the wheels have finished surfaces, and separate filler blocks are furnished to insert in these gaps when the machine is used as a regular axle lathe. When the blocks are inserted, the carriages have ample travel for turning both the wheel seat and the journal fit, also finishing the fillets of the axle and burnishing.

The center driving head is of the opening type to allow axles with wheels mounted to be placed on the center. The large driving gear is made in two halves with coarse pitch and wide face teeth and rotates in two large bronze bearings, one on either side of the center. The pinion meshing with this large gear runs in oil and is mounted on a heavy shaft located in the center of the bed and driven from the speed change gears located in the left end of the bed. Three speed changes are available through steel sliding gears, and these speeds are changed from the center of the machine.

The carriages are driven from a spindle feed rod through steel gears, giving a range of four speeds. Feeds are changed from the center of the machine. The machine is driven by a single pulley or alternating current motor, the drive being through a powerful friction clutch with automatic brake. All operating levers are placed near the operator, giving complete control from his normal position. Either a 45 or 55-inch swing in the gaps is furnished and axles of various lengths can be accommodated as both tail stocks are adjustable along the bed of carriage and have sufficient travel to accommodate the longest journals.

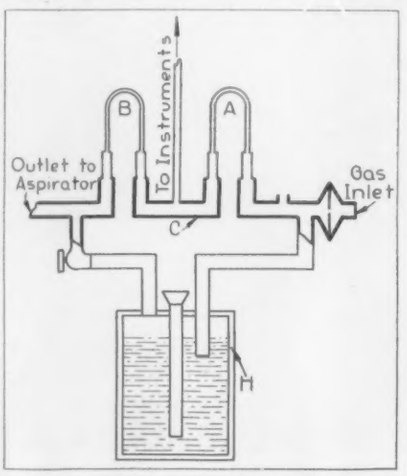


DIAGRAM OF WORKING PARTS OF CARBON MONOXIDE RECORDER

Builds Carbon Monoxide Recording Instrument

For use either as a separate instrument or as an adjunct to the CO_2 recorder, the Uehling Instrument Co., Paterson, N. J., has introduced a new type of CO recorder. A diagram of the working parts of the new device is shown in the accompanying illustration. *A* and *B* are platinum tubes of small bore, heated electrically, through which the gas sample flows continuously. If CO or any other combustible gas is present, it will burn within the heated tube *A* and increase the temperature of the tube, the degree depending upon the amount of combustible material present.

The burnt gas then flows through the platinum tube *B* and out of the latter under a fixed suction. The hotter the tube *A*, becomes the more expanded will be the gas flowing through it and consequently less gas will enter chamber *C* as the gas in tube *A* becomes hotter. The outlet suction does not vary, hence the decreasing flow of gas through tube *A* results in a greater partial vacuum in chamber *C*. Thus the varying suction in chamber *C* becomes a measure of the heat units in the gas. By connecting chamber *C* with recording gages by means of a tube, the quantity of combustible can be recorded at a distance from the instrument. The recorder is calibrated in percentage of CO, however, if hydrocarbons or hydrogen are present they will be recorded in terms of CO of equivalent heat value. Either direct or alternating current can be used in heating the gas chambers.

When this device is used independently of the CO_2 instrument made by this company, it is necessary to employ the suction regulator shown at *H*. This mechanism maintains a constant suction of six inches of water at all times, the suction extending as far as the chamber *A*. The gas line is protected against fouling and corrosion by the filtering, drying and desulphurizing system.

Introduces Two-Spindle Drill Press

For use in drilling and reaming cast iron bushings the Colburn works of the Consolidated Machine Tool Corp. recently has introduced a two-spindle, heavy-duty drill press. The press is equipped with steady supports and a special three-station rotating table. Two heads are mounted on a common column which carries a bracket-type table extending the full length of the machine. A rotating table with three stations, for loading, drilling and reaming respectively, is clamped to the table of the machine. Steady supports are provided for holding up the bar. Two levers are provided, one for releasing the index latch and the other for clamping the table in position after it has been indexed. An automatic trip, together with spring-type counterweights, automatically return the spindle to the starting position after each operation.

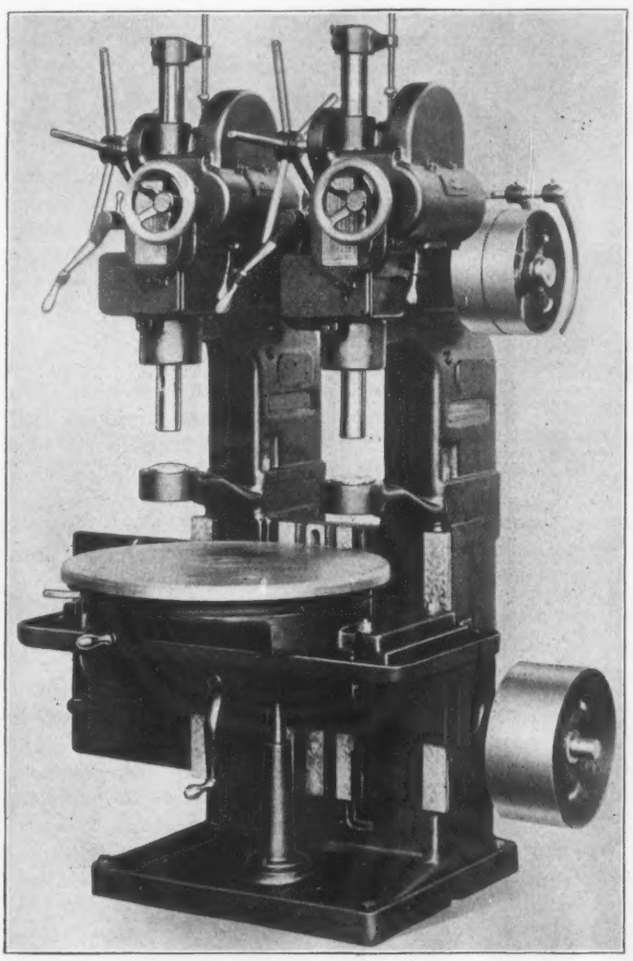
A 5-horsepower motor is mounted on a motor bracket at the rear and is geared to the jack shaft. Each head is driven by a belt from this shaft. The heads are entirely independent of each other and can be operated at different feeds and speeds. This machine, it is claimed, is a production tool suitable for machining duplicate parts in quantities, being adapted for handling a variety of work requiring a wide range of speeds and feeds. The transposing gear arrangement permits unusual flexibility and provides a means for securing correct feeds and speeds.

In some work where two stations for drilling are wanted, a four-station rotating table can be used instead of three. The table then would be indexed 180 degrees to bring the work under the spindles. A view of the drill press with the special three-station rotating table is shown in the accompanying illustration.

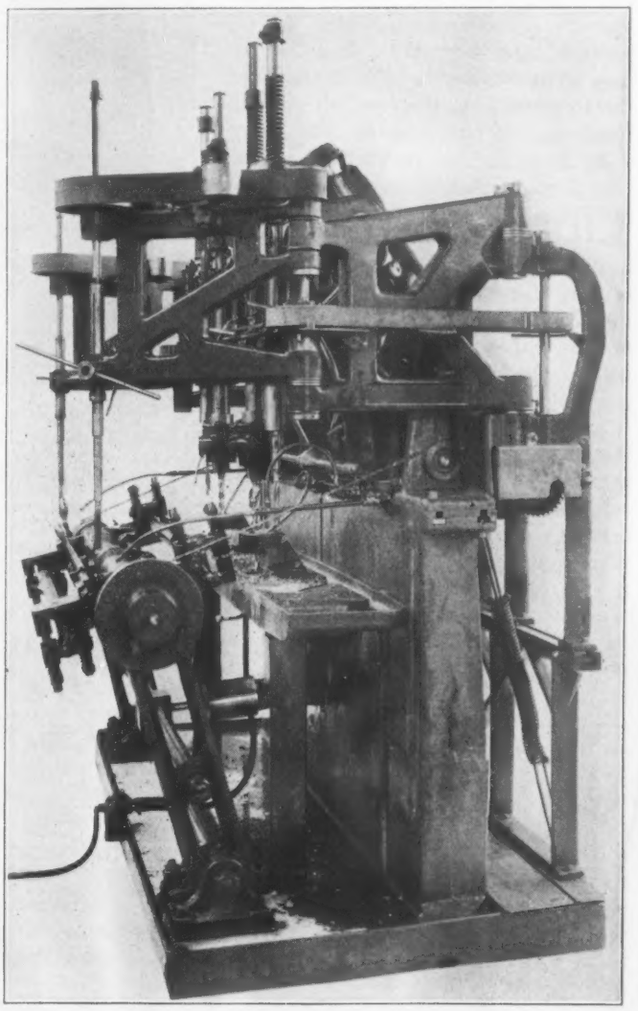
Saves Time in Drilling and Reaming Axles

To save time in drilling and reaming automobile front axles, a turnover jig has been added to the 4-spindle 24-inch gang drills manufactured by the Barnes Drill Co., Rockford, Ill. Two radial heads have been added to the gang, the heads being of a jointed construction so that they swing into the reaming position without interfering with the main spindles which drill the king pin holes. Thus, while the axle is being drilled under the main spindles using auxiliary heads for the spring pad holes, the king pin holes are reamed in the outer or upside down position of the turnover jig. In this way the drill bushing is out of the way of the reamer.

The finished axle then is removed and a new forging chucked in the jig, the reaming and unloading being accomplished during the drilling operation in the opposite position. An air cylinder at the base of the machine, governed by a foot pedal, pushes the jig to the outer position so that it clears the table when turned over. The air cylinder then draws the jig back into a working position, less than 10 seconds being required for indexing. The jig has a quick lateral adjustment to bring the bushing guides to the center of the boss on the axle forging, which has a slight variation



DRILL PRESS EQUIPPED WITH STEADY SUPPORTS AND A THREE-STATION ROTATING TABLE FOR LOADING, DRILLING AND REAMING



ADJUSTABLE HEAD GANG DRILL HAVING TURNOVER JIG

due to the shrinkage of the overall length of the forging. In a like manner the outer spindles of the 24-inch drills are brought to the center of the bushing by the movement of one lever at the center of the machine, which is shown in the accompanying illustration.

New Line of Board Drop Hammers Developed

A line of drop hammers incorporating a number of new and improved features recently has been introduced by Merrill Bros., New York. The capacity of the hammers ranges from 600 to 5000 pounds falling weight. The features claimed for this line are adjustment to compensate for uneven wear of the roll bearings, rigid and nonadjustable upright frames, inserted adjustable and reversible ram guides, treadle safety lock, straight friction bar, and front and back die adjustment immovable when locked.

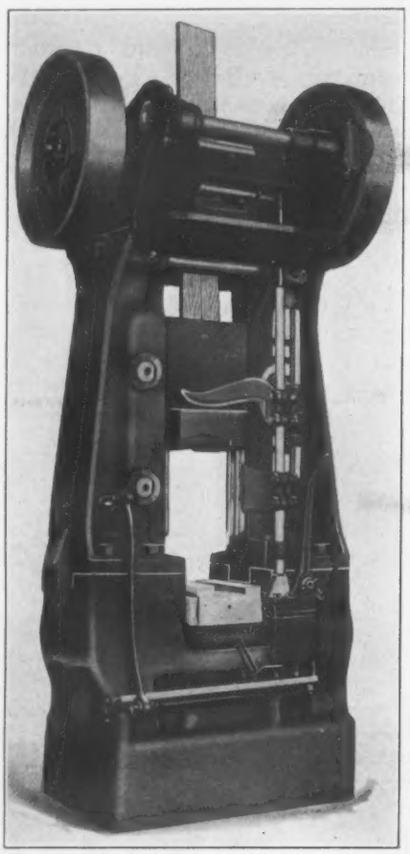
In the new lifter the arrangement of sliding boxes heretofore employed has been changed by the substitution of roll rockers. The direct horizontal pressure against the board is maintained as with the sliding boxes, with the claimed advantage of better support for the roll pressure and belt pull. The hammer may be operated with belts driving from the front or from the rear or one from the front and one from the rear.

To maintain the parallelism of the rolls a compensating eccentric has been introduced in one of the eccentric sleeves, the adjustment being accomplished quickly without removing any of the lifter parts. If desired the hammer can be arranged for using a thick or thin lifting board by changing the roll eccentric bushing. The eccentric construction is such that when the friction bar falls, the rolls practically are locked. This arrangement, it is claimed, permits the use of a light friction bar, rolls the board more nearly straight, and prevents excessive wear near the point of pick-up.

The roll releasing lever lifts the friction bar to its seat without shock or jar, permitting the hammer to run at practically as high a speed as the lifting board will stand. By means of a rolling contact on a nonmetallic surface on the ram, the leverage shortens as the friction bar is raised thereby giving a large friction roll opening. The under surface of the lever is curved causing a constant vertical pressure against the ram, and thus minimizing the kickback on the whole roll releasing mechanism.

Provision has been made for truing the V's of the uprights when they become too badly worn to make accurate forging possible. Adjustment and reversible ram guides are fitted to the steel upright frames and a planer large enough for truing the V's of the ram will be large enough for planing the guides. Because of the ease in removing and replacing the inserted guide, it is expected that the V's will not become badly worn.

To prevent accidents through accidental tripping of the treadle, a device has been attached making it impossible to trip the treadle except by placing the foot on the pad provided. Die adjustment from front to back is accomplished by means of a double taper insert in the top of the forged steel shoe opposite the die key. A view of the machine is shown in the accompanying illustration.



HAMMERS MADE IN CAPACITIES RANGING FROM 600 TO 5000 POUNDS FALLING WEIGHT

Heat Treating Principles

(*Concluded from Page* 172)

carbonizing, therefore, is necessary. If the case is high carbon, there is first required a refinement of the grain of the core, carried out by heating to just above the upper critical point of the core and quenching, and then for refining the case, reheating to just above the upper critical point of the case, or in the instance of a hyper-eutectoid case, to a lower temperature and then again quenching followed by tempering or drawing.

For parts requiring only superficial hardening the liquid cements, sodium cyanide or mixtures of this and the ferrocyanides, are used. The molten cyanide bath is contained in iron pots heated by oil or gas, the temperature of the cyanide being from 840 to 870 degrees Cent. (1550 to 1600 degrees Fahr.). The parts to be hardened are immersed in the bath for 10 to 20 minutes, which suffices to uniformly heat them through and form a case of high carbon content, a few thousandths of an inch thick, the active agent being the carbon of the cyanogen. The parts then are removed and quenched in water, which gives a very hard case. Superficial hardening also is carried out by packing the parts in solid cement in boxes, and heating for two to three hours, and then quenching in oil. The higher carbon content of the case thus obtained makes oil quenching as effective as regards hardening as water quenching in the cyanide method. Hardening by molten cyanides is known as "pot hardening," and the method by packing in boxes with solid cement and heating in furnaces as "pack hardening."

The boxes for carbonizing usually are rectangular or annular in shape and are made of malleable iron, or white cast iron, and sometimes of low-carbon steel plate. Boxes do not last long as they soon warp and crack. More recently nichrome, an alloy of nickel, chromium and some iron, and also other alloys, have come into use. The cost of these is much greater but their longer life more than makes up for first cost.

From the foregoing general discussion, it is apparent that the uniform heating and close control of temperature within narrow limits are of the utmost importance for successful heat treatment. The furnace temperatures employed in heat treatment are relatively low, rarely exceeding 1000 degrees Cent. (1832 degrees Fahr.), and for such temperatures the thermocouple pyrometer, combined with suitable indicating instruments is most desirable, for measuring the temperatures. Both the so-called cheaper base-metal thermocouples and the expensive platinum-platinum rhodium wire couples are used. Methods of installing temperature measuring devises are given in Chapters V and VI, in connection with the description of furnaces. The pyrometer, however, merely indicates the temperature and in fact is nothing more than a high-temperature thermometer; the real work of heat treatment rests with the furnace. It is of the utmost importance for successful commercial work that the furnaces be designed to give uniform heating, control of the rate of heating and cooling, and economy in fuel.

The purpose of this chapter is to give a general view only of heat treatment operations, and the detail of methods and results will be found in Chapters V, VI, VII and VIII.

Obituaries

ALEXANDER GUSTAVE EIFFEL, builder of the famous tower at Paris which bears his name, died in that city, Dec. 27 of cerebral congestion. Mr. Eiffel was 91 years of age. He had been retired from public life since 1893, when he was drawn into the Panama scandal, but until last summer, when the first symptoms of the cerebral trouble appeared, he worked regularly in his laboratory. In addition to the Eiffel tower, Mr. Eiffel was the designer of some of the largest bridges and viaducts in France.

* * *

Charles H. Pond, president of the Scranton Forging Co., Scranton, Pa., for 33 years, died recently.

* * *

Harry Marsh, for many years superintendent of bridge and road construction for the E. C. Lewis Construction Co., Toronto, Ont., died Dec. 25 at the age of 71 years.

* * *

Carl C. Backus, general superintendent of the Simmons Co. works, Kenosha, Wis., died Dec. 28 from an operation for acute appendicitis. He was 49 years of age and a native of Dixon, Ill.

* * *

Miss Cerula Woodbury, manager of an iron foundry at Great Falls, Mont., and reported as the only such woman manager in the country, died there Dec. 29 at the age of 52 years.

* * *

Robert Swinburn Wood, secretary and cost expert of the National Stove Manufacturers' association, died suddenly Dec. 27 of heart disease in Troy, N. Y., aged 67 years.

* * *

Edward Preston Usher, perfector of a storage battery, inventor and author, died Dec. 26 at his home at Grafton, Mass. Mr. Usher was born in Lynn, Mass., in 1851.

* * *

Theodore W. Cramp, grandson of the founder of the Cramp Shipbuilding Co., Philadelphia, died Dec. 23 at his home in that city, aged 64 years. In early life he was treasurer of the Cramp company and later entered the brokerage business.

* * *

Richardson W. Walsh, aged 43 years, in the machinery business in Chicago until ill health compelled his retirement a year ago, died recently at his home in Hubbard Woods, a suburb of Chicago.

* * *

Charles H. Deming, head of Deming Hardware Co., Montpelier, Vt., and Quincy, Mass., died recently at his home in Brookline, Mass. Mr. Deming was 72 years old and was born at Danville, Vt.

* * *

Norman Butterfield, principal owner of iron ore claims at Lake Athabasca, Manitoba, died at Fort McKay, Jan. 1 of pneumonia. He was head of a Chicago syndicate. Mr. Butterfield left there some time ago to revisit his claims.

* * *

Parke G. Myers, president and manager of the Canton Signal & Sign Co., Canton, O., died in that city Dec. 27, aged 36 years. Graduated from college in 1909 he became production manager of American Steel Foundries Co., Alliance, O. Later he developed and patented a safety road signal made of steel which is in use throughout the United States. Seven years ago Mr. Myers organized the Canton Signal & Sign Co. and was its president and general manager until his death.

* * *

Julian B. Huff, aged 42, prominent coal operator, died in the Bryn Mawr hospital, Philadelphia, Dec. 23, after a brief illness. He was president of the Keystone Coal & Coke Co., the Latrobe-Connellsville Coal & Coke Co., and various other coal companies.

* * *

E. R. Swanson, official of the Keokuk Steel Casting Co., Keokuk, Iowa, died Dec. 13. For a number of years Mr. Swanson was connected with the Duquesne Steel Casting Co., Coraopolis, Pa., as superintendent and as works manager.

* * *

Charles H. Koppleman, formerly president of the Crown Cork & Seal Co., Baltimore, Md., died in that city, Dec. 28 of apoplexy. Mr. Koppleman was 72 years of age. He became president of the Crown Cork & Seal Co. after the death of Joseph Friedenwald, with whom he organized the company. He resigned as president in 1912 and as director two years later.

* * *

Malcolm W. Edgar, secretary of the Detroit Belt Lacer Co., Detroit, died Dec. 22. Mr. Edgar formerly was identified in an official capacity with the American Car & Foundry Co. in its Detroit plant. Later he formed the Detroit Can Co., which was absorbed by the American Can Co. He was a graduate of the University of Michigan.

* * *

James Findlay, for 18 years superintendent of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., died at his home in that city, Dec. 20. He was 62 years of age. Previous to his connection with the Birdsboro company, Mr. Findlay had been superintendent of the plant of the Philadelphia Roll & Machine Co., Philadelphia.

* * *

William T. Stubbs, chairman of Joseph Stubbs, Ltd., Openshaw, Manchester, England, iron founder and manufacturer of textile machinery, died at Bournemouth, England, on Dec. 13 at the age of 66 years. Mr. Stubbs is survived by his brothers, among whom is Oliver Stubbs, president of the Institute of Britsh Foundrymen. Until recently W. T. Stubbs was actively engaged in business. He was at one time president of the Manchester chamber of commerce and was unusually prominent in business affairs in the north of England.

Convention Calendar

Jan. 10-11—Federated American Engineering societies. Annual meeting at Washington. L. W. Wallace, 719 Fifteenth street N. W., Washington, is secretary.

Jan. 17-19—Gas Products association. Tenth midwinter convention, Blackstone hotel, Chicago. C. T. Price, 140 South Dearborn street, Chicago, is secretary.

Jan. 18—American Society of Safety Engineers. Annual meeting in New York.

Jan. 22-24—Engineering Institute of Canada. Meeting at Montreal and Ottawa. Frazier F. Keith, 178 Mansfield street, Montreal, is secretary.

Jan. 22-25—Society of Automotive Engineers. Annual meeting, General Motors building, Detroit.

Jan. 23-24—American Institute of Steel Construction. Annual meeting William Penn hotel, Pittsburgh. Charles F. Abbott, 350 Madison avenue, New York, is executive director.

Jan. 31-Feb. 1—American Society for Steel Treating. Winter sectional meeting, Rochester, N. Y. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

Feb. 4-9—American Ceramic society. Annual meeting, Atlantic City, N. J. R. C. Purdy, Ohio State University, Columbus, O., is secretary.

Feb. 18-21—American Institute of Mining and Metallurgical Engineers. Meeting in New York. F. F. Sharpless, 29 West Thirty-ninth street, New York, is secretary.

Exports Increase; Imports Lower

November Shipments of Iron and Steel Products from United States Total 189,142 Tons, a Gain of 34,255 Tons Over October—Imports Drop Off to 26,294 Tons, Being Eighth Month of Decline

EXPORTS of iron and steel products from the United States in November totaling 189,142 tons, recovered sharply from the slump of the past few months and represented the largest monthly aggregate since May, according to figures of the department of commerce. Imports continued to drop, November's receipts totaling but 26,294 tons compared with 29,556 tons for October and 141,249 tons in November, 1922.

For the 11 months ended Nov. 30, 1923, 1,800,237 tons of iron and steel and their products was shipped from the United States, compared with 1,868,471 tons for the like period of 1922, and with 2,023,558 tons for the entire year of 1922. Imports for the 11 months ended November amounted to 706,781 tons against 567,827 tons for the like period of 1922 and 664,185 tons for all of 1922.

Most of the materials and products exported showed an increase in November. Iron and steel rails were shipped in the largest quantity, 26,900 tons being exported in that month against 21,122 tons in October. For the 11 months of 1923, 245,844 tons of rails was exported, as compared with 259,569 tons for the same period of the preceding year. Structural shapes both fabricated and plain furnished a large amount of tonnage. Fabricated shapes for the 11 months of 1923 totaled 32,675 tons as compared with 18,773 tons for that period of 1922. In November, 4148 tons of plain shapes was shipped; 1768 tons was exported in the same month of 1922. Plain shapes exported in November totaled 9103 tons, while in that month in 1922, 8376 tons was shipped. For the 11 months of 1923 115,984 tons was shipped; 57,183 tons was exported in the same months of the year preceding.

Black steel sheets were shipped in large quantities in November when the aggregate was 17,188 tons. It was 5290 tons for the same month last year and 7859 tons for October. The total for the 11 months of 1923 is considerably below that of the same period of 1922. The total shipped was 102,463 tons while it was 209,439 tons for the 11 months of the year preceding.

Exports of iron bars have dwindled away, with but 493 tons shipped in November. In October 512 tons was shipped and in November, 1922, 10,551 tons. Pig iron, scrap and semifinished exports continue about on an even keel. Shipments of wire and wire products have increased, barbed wire exports in October amounting to 3840 tons while those in November totaled 6533 tons. Plain wire also increased. November shipments were 4653 tons and those in October, 2282 tons.

Ferromanganese and spiegeleisen shipments, returned more closely to normal after the unusually large month of October when 1019 tons was shipped. In November only 9 tons was exported. Ferrosilicon exports varied little, 79 tons being shipped in November, 72 tons in October, 49 tons in November, 1922 and 78 tons in October, 1922.

Most of the reduction on November imports from those of October was accomplished by the decrease of ferromanganese receipts to 4211 tons from the 8802-ton total received the previous

IMPORTS AND EXPORTS
Gross Tons

	1923		1922	
	Imports	Exports	Imports	Exports
Jan.	119,955	135,046	13,404	165,962
Feb.	67,682	136,853	11,535	133,333
March	106,050	168,176	12,774	206,474
April	77,794	183,905	18,720	197,562
May	75,840	195,535	23,098	229,616
June	67,968	176,403	39,154	216,298
July	53,451	170,259	56,425	161,204
Aug.	45,612	163,010	49,054	144,264
Sept.	36,562	175,429	76,378	128,370
Oct.	29,556	154,887	174,764	138,887
Nov.	26,294	189,142	141,249	129,647
Dec.	.....	.....	96,358	154,087
Total	650,914	1,505,616	664,185	2,023,558

Year	Imports	Exports
1921	135,825	2,150,276
1920	421,274	4,934,087
1919	322,264	4,397,295
1918	169,110	5,338,019
1917	330,201	6,465,053
1916	328,965	6,110,732
1915	282,396	3,532,564
1914	289,775	1,549,554
1913	317,260	2,745,635

IRON AND STEEL EXPORTS
Gross Tons

	—November—		Eleven months ended November	
	1923	1922	1923	1922
Pig iron	3,198	3,464	29,568	27,784
Scrap	6,167	1,598	60,567	62,023
Semifinished	8,341	7,166	107,298	99,361
Iron bars	493	10,551	12,346	165,711
Steel bars	12,366	325	147,319	5,025
Alloy steel bars	60		2,097	
Wire rods	8,005	1,230	34,378	38,926
Boiler plate	454	341	11,432	11,836
Other plates	5,347	8,058	96,995	77,850
Galvanized sheets	7,791	6,453	107,375	102,686
Black sheets, steel	17,188	5,290	102,463	209,439
Black sheets, iron	780	732	13,518	10,702
Cold rolled strips	520	384	10,758	4,808
Hoops, bands and scroll	2,436	2,443	25,551	25,946
Tin and terne plate	14,634	3,891	105,861	70,120
Structural shapes, plain	9,103	8,376	115,984	57,183
Structural shapes, fabricated	4,148	1,768	32,675	18,773
Ship and tank plates, punched and shaped	183	259	2,812	2,353
Metal lath	214	**	1,347	**
Other structural forms	4,350	4,553	39,229	69,167
Rails over 50 pounds	23,360	13,839	221,185	230,540
Rail under 50 pounds	3,540	5,069	24,659	29,029
Rail joints, etc.	2,128	2,419	21,081	20,070
Switches, frogs, etc.	405	690	4,848	5,499
Railr'd spikes	558	774	7,941	7,253
Railr'd bolts, nuts, etc.	160	304	2,442	2,107
Boiler tubes	1,147	1,158	15,429	10,938
Casing and oil line pipe	10,419	3,492	56,889	45,538
Welded black pipe	5,412	5,363	71,526	68,365
Welded galvanized pipe	2,312	2,849	26,535	29,616
Mal'ble iron pipe fittings	1,054	518	7,856	7,408
Cast iron pipe	1,451	1,701	14,338	16,719
Cast iron pipe fittings	1,098	873	11,891	8,001
Galvanized wire	4,083	2,810	48,908	72,815
Barbed wire	6,533	4,981	65,230	65,840
Plain wire	4,653	2,396	36,151	32,876
Woven wire fencing	347	174	3,905	2,540
Wire cloth and screening	98	145	1,823	1,418
Wire rope	412	243	5,834	4,205
Insulated wire and cable	87	106	1,346	856
Other wire	178	1,211	13,454	14,597
Cut nails	113	174	2,308	3,333
Wire nails	6,942	3,240	39,491	52,206
Horseshoe nails	74	87	1,034	717
Other nails	388	343	4,888	3,727
Bolts, nuts, rivets, etc.	1,445	1,418	17,505	16,737
Horseshoes	90	69	861	872
Other iron and steel	4,789	6,263	6,194	53,399
Ferromanganese and spiegeleisen	9	5	4,293	1,064
Ferrosilicon	79	49	814	493
Total	189,142	129,647	1,800,237	1,868,471

*Includes ingots, blooms, billets, slabs and skelp, sheet and tin plate bars.
**Due to reclassification, comparisons are not possible.

CASTINGS AND FORGINGS EXPORTS
Gross Tons

	November		Eleven months ended Nov.	
	1923	1922	1923	1922
Iron castings	572	987	9,218	9,233
Steel castings	230	133	4,404	1,869
Car wheels and axles	1,970	1,753	19,620	15,667
Iron and steel forgings	200	160	2,823	2,161
Total	2,972	3,033	36,065	28,930

FERROALLOY EXPORTS
Gross Tons

	November		Eleven months ended Nov.	
	1923	1922	1923	1922
Ferrosilicon	79	49	814	493
Ferromanganese and spiegeleisen	9	5	4,293	1,064
Tungsten, manganese and other ores	125	....	932	....
Ferrotungsten, tungsten metal and wire	....	....	2	....
Other ferroalloys	4	1	150	561

month. The remainder of the materials and products on the import list showed little variation. Pig iron decreased from 9349 tons in October to 9299 tons in November. Ferrosilicon increased from 571 tons to 863 tons. Scrap also showed a slight increase, from 3046 tons in October to 3110 tons in November. Rail shipments increased from 2881 to 3366 tons. Tin plate receipts in November more than doubled those in October, the imports being 108 tons against 47 tons respectively. Imports of tubular products increased from 406 tons to 465 tons.

PIG IRON IMPORTS

Gross Tons

From:—	Nov., 1923
Belgium	449
England	148
Scotland	350
Quebec-Ontario	6,552
British India	550
China	1,250
Total	9,299

IRON ORE IMPORTS

Gross Tons

From:	November 1923	November 1922	Eleven months ending November 1923	Eleven months ending November 1922
Spain	1	6,994	214,891	46,930
Sweden	20,562	35,116	725,429	295,153
Canada	178	168	24,703	2,523
Cuba	13,300	45,157	660,679	321,646
Other countries	43,613	72,706	985,538	301,683
Total	77,654	160,141	2,611,240	967,935

IRON AND STEEL IMPORTS

Gross Tons

	November 1923	November 1922	Eleven months ended November 1923	Eleven months ended November 1922
Pig iron	9,299	98,767	355,465	328,717
Ferromanganese	4,211	6,267	86,663	99,577
Ferrosilicon	863	415	11,341	13,438*
Scrap	3,110	25,575	157,526	54,252*
Bar iron	236	2,114	7,360	6,902
Steel ingots, bars, etc.	2,943	2,006	20,371	25,955
Structural shapes	523	3,055	9,046	6,376
Rails	3,366	1,377	28,775	25,637*
Boiler and other plates	51	320	1,713	994
Sheets and saw plates	233	274	2,490	363*
Tin plate	108	33	9,847	2,336
Wire rods	294	120	3,612	1,449
Total	25,237	140,323	694,209	565,996

OTHER IMPORTS

Gross Tons

	November 1923	November 1922	Eleven months ended Nov. 1923	Eleven months ended Nov. 1922
Tubular products	465	308	4,160	613*
Round iron and steel wire	204	230	3,475	511*
Castings and forgings	150	162	2,504	322*
Nails and screws	9	27	1,015	136*
Nuts, bolts, rivets, etc.	26	4	202	35*
Flat wire and strip steel	203	195	1,216	214*
Grand total	26,294	141,249	706,781	567,827

*Beginning Sept. 22, 1922.

In ferroalloys, ferromanganese and spiegeleisen exports were the largest, 4293 tons being shipped as compared with 1064 tons for 11 months of 1922. Ferrosilicon exports totaled 814 tons against 493 tons in the 11-month period of 1922.

Manganese ore imports, while larger than those of November, 1922, were considerably below those of the preceding months. In November 1923, 14,790 tons was received, as compared with 9967 tons in the same month of 1922. For the 11 months ended November, 1923, imports totaled 184,983 tons, while in the same period of 1922, 366,146 tons was received.

Imports of iron ore in November totaling 77,654 tons were less than half of those of the same month of 1922 when receipts totaled 160,141 tons. For the 11 months of 1923, iron ore imports totaled 2,611,240 tons as compared with 967,935 tons for the same period of 1922. Sweden contributed the largest tonnage in November, shipments from that country alone amounting to 20,562 tons and 725,429 for the 11 months of 1923.

FERROMANGANESE AND MANGANESE ORE IMPORTS

Gross Tons

Manganese ore from:	Nov., 1923
Germany	53
Turkey-in-Asia	1,920
Brazil	8,877
British India	3,940
Total	14,790
Ferromanganese from:	
Germany	8
England	4,203
Total	4,211

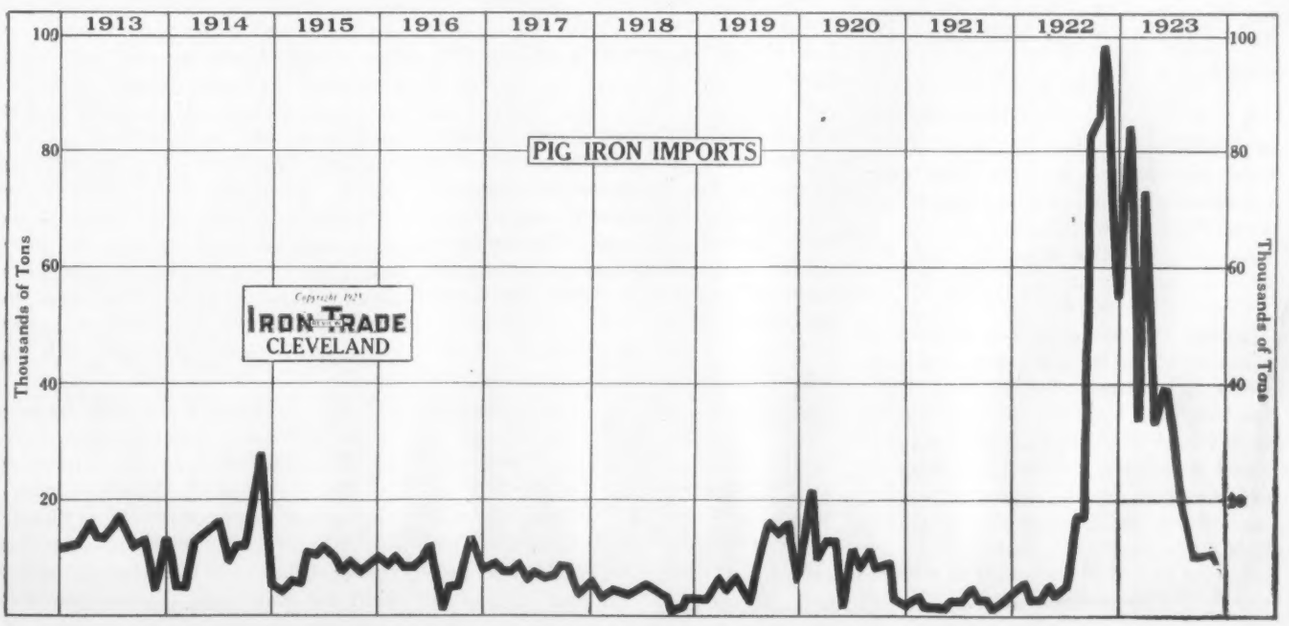
IMPORTS OF VARIOUS ORES AND FERROALLOYS

Gross Tons

	November 1923	November 1922	Eleven months ended November 1923	Eleven months ended November 1922
Ferromanganese	4,211	6,267	86,663	17,496*
Ferrosilicon	863	415	11,334	13,439
Manganese ore	14,790	9,967	184,983	366,146
Tungsten bearing ore	.....	.....	.....	1,675
Nickel ore	225	.....	5,990	395
Total	20,089	16,650	288,970	399,151

*Beginning Sept. 22, 1922.

Wisconsin Foundry & Machine Co., 613 East Main street, Madison, Wis., has issued $35,000 8 per cent cumulative preferred stock. The company manufactures and distributes electrical supplies, foundry products, machinery and general supplies for mines, power plants, etc. The company was established in 1912, when its annual volume of business was $47,900. In 1922 it reached $247,775 and up to Nov. 1 this year it was $357,639.



Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields of Enterprise

PERCIVAL JOHNSON who recently was elected president of the Eastern Pig Iron association is president of the Pulaski Iron Co., with headquarters in the Real Estate Trust building Philadelphia. Mr. Johnson was born and educated in Yorkshire, England. His first position in the United States was with the Dayton Coal & Iron Co., Dayton, Tenn. In 1898 he went to Buena Vista, Va., as blast furnace superintendent for the Virginia Coal & Coke Co. He later occupied similar positions with the Allegheny Ore & Iron Co., Buena Vista, Va., and with Richard Hecksher & Sons, Swedeland, Pa. Early in 1905 he joined the Pulaski Iron Co., and after serving as mine manager and general manager he was elected president.

* * *

William Hendrie was elected president of the Hamilton Bridge Works Co., Hamilton, Ont., succeeding his brother the late Sir John Hendrie.

* * *

Frank I. Haxer is manager of the recently incorporated Burt D. Howe Co. of Canada, Ltd., Windsor, Ont., dealer in iron and steel.

* * *

Charles M. Schwab was to adress the annual dinner of the National Automobile Chamber of Commerce, held at the Commodore hotel, New York, Jan. 8. His subject was "A Comparison of the Steel and Automobile Industries."

* * *

L. C. Cleary, formerly president of the L. C. Cleary Co., New York, became associated with the Debevoise-Anderson Co, Inc., 114 Liberty street, New York, Jan. 1, and will be in charge of the latter company's iron ore department.

* * *

Samuel T. Harleman has resigned as assistant to the vice president and general sales manager of Atlas Steel Corp., Dunkirk, N. Y. and will be connected with Henry Disston & Sons, Inc., Tacony, Philadelphia, as assistant manager of the steel sales department. Mr. Harleman was graduated from Lehigh university in 1901 in mechanical engineering and after five years in the motive power department of the Lehigh Valley railroad entered the steel business in 1906 with the Bethlehem Steel Co., at the Bethlehem plant, leaving there in 1918 to go with the Atlas company.

* * *

Robert P. Lamont, president of American Steel Foundries, Chicago,

PERCIVAL JOHNSON

has been made a trustee of the University of Chicago, at Chicago, according to announcement by Ernest DeWitt Burton, president of the university.

* * *

T. M. Girdler, the new general manager of the Jones & Laughlin Steel Corp., Pittsburgh, has established his residence in Pittsburgh, having purchased a home there. He formerly was general superintendent of the Aliquippa works of the Jones & Laughlin corporation at Woodlawn, Pa.

* * *

J. E. McLurg has been appointed vice president of the British Empire Steel Corp. He will be in charge of operations of all constituent companies with headquarters at Sydney, N. S., in place of D. H. McDougall, who resigned several months ago. Mr. McLurg at one time had been general manager of Halifax Shipyards, Ltd. He also was formerly superintendent of transportation and sales manager of the Algoma Steel Corp.

* * *

W. R. Webster, who recently became connected with the Jones & Laughlin Steel Corp., Pittsburgh, as assistant chief engineer of the south side works, was formerly head of the gas purification division of Koppers Co., Pittsburgh. He was at one time chief engineer of the Cambria Steel Co., Johnstown, Pa.

* * *

A. F. Harvey, recently elected president of the Pittsburgh Steamship Co. to succeed Harry Coulby, resigned, was formerly vice president and assistant general manager. Mr. Harvey was graduated from Yale in the late '90's after which he entered the employ of Pickands Mather & Co. When Mr. Coulby became president and general manager of the Pittsburgh company, Mr. Harvey was called as assistant general manager. He has been in active charge of the vessel operation of the company since his election several years ago as vice president.

* * *

L. J. Affelder, for the last three years in charge of the marine department of the American Bridge Co., Pittsburgh, and formerly assistant division contracting manager, has been made division contracting manager of the combined marine and structural departments of the American Bridge Co. in charge of the central district, comprising Detroit, Cincinnati, Cleveland and Pittsburgh. He succeeds the late R. W. Bailey. Mr. Affelder has been affiliated with this company and its predecessor for about 30 years, being assistant engineer for the Pittsburgh Bridge Co. at the time the American Bridge Co. was organized, when he became identified with the latter's sales department.

George E. Shepard, formerly assistant to the division contracting manager of the American Bridge Co., Pittsburgh, has been appointed assistant division contracting manager. Mr. Shepard has been identified with the American Bridge Co. in its contracting department for many years.

Machinery Buying in Prospect

Inquiries Before the Trade Are Plentiful, Coming from Diversified Industries—General Condition Points To Better Conditions in Near Future—Crane Market Takes Healthier Tone

WHILE several distributing centers for machine tools and shop equipment report a slack market, good business is being realized in other sections. In the Cleveland district no holiday slackness was experienced. Instead a general pickup developed in the middle of December and has extended up to the present time. Inquiries at present are good.

The largest inquiry out at present is from the General Electric Co. for $150,000 worth of equipment for the new Philadelphia plant. Other inquiry includes the Ingersoll-Rand Co., New York; the Crosley Mfg. Co., Cincinnati; the Standard Oil Co., Whiting, Ind., and the A. O. Smith Co., Milwaukee. Inquiries now out are divided among a large variety of industries.

Sales reported include five turret lathes to the General Electric Co., and several tools for the Big Four, Pere Marquette, New York Central railroads, the Illinois Steel Co., the City of New York, and the Bethlehem Steel Co.

A better tone is noted in the crane market, and it is thought by men of the trade that the increased inquiry of the last few weeks shortly will materialize into good business. A fair amount of buying is now apparent, locomotive cranes being in greatest demand.

General Electric Co. Sends Out Large List

NEW YORK, Jan. 8.—The first sizable machine tool inquiry of the new year in this district calls for about $150,000 of equipment for the new Philadelphia plant of the General Electric Co. Among the items specified are several boring machines, milling machines, shapers, engine lathes, and radial drills.

Inquiry as a whole shows an improvement over the past couple of weeks, although comprised chiefly of single machines. Sellers, generally, look for an improvement in buying this month, with the holidays and inventory season out of the way. Included in current buying are two axle lathes for the Big Four railroad; a journal turning and axle lathe for the Pere Marquette railroad; three car wheel borers for the Illinois Steel Co., and a 16 x 30-foot lathe, for the Bethlehem Steel Co., this business all going to an eastern builder. The City of New York, through the department of plants and structures, has also placed with this seller orders for a punch and shear and 1100-pound steam hammer. The Ingersoll-Rand Co., New York, is figuring on several machines for Easton, Pa.

The crane market is somewhat better in tone, it being believed that the improved inquiry of the past two or three weeks will develop into some substantial business.

Tool Inquiries Heavy

PITTSBURGH, Jan. 8.—Holiday dullness continues largely to characterize the machine tool and equipment market although a large number of inquiries are pending on which action probably will be taken within the next two weeks. Many companies still are at work upon the inventories and have not taken time to place contracts for their equipment needs. While the New York Central railroad has bought several machine tools, the Pennsylvania railroad continues to defer action as does the Standard Sanitary Mfg. Co. on its large list for its new Baltimore plant.

A fairly large number of single tools have been placed, including lathes, drills, bolt cutters, etc., and in the used machinery market a large number of inspections are being made and a sale worthy of note is that of an 84-inch boring mill to a local manufacturer. Several single crane installations have been awarded.

Chicago Market Light

CHICAGO, Jan. 8.—The machinery market has not yet cast aside its holiday inertia. A few houses report good sales off their floors but the majority find business still as dull as a week and two weeks ago. Due to a fire in its works at Whiting, Ind., the Standard Oil Co. is in the market for three drill presses, three of four radial drills, two or three boring mills and two or three planers. Its lathes were damaged by water but probably can be salvaged. The A. O. Smith Co., Milwaukee, is expected to close shortly for a part of its revised, long list of tools for which it has had an inquiry out for two months. Although a committee of the board of education has inspected tools desired for the new Tilden technical high school, it is said buying may be deferred two months. The Marshall & Huschart Co., Chicago, yesterday began disposing of the tools in the Harroun Motor Car Co., at Wayne, Mich. One machinery house is about to close a deal for several tools approximating $35,000 altogether.

Prospects Bright for 1924

BOSTON, Jan. 8.—Sales since Jan. 1 show an improvement compared with the last two weeks in December, but this is only natural and dealers report that the real buying still holds off. An electrical goods manufacturer bought a large grinder and two automatic screw machines. A New Hampshire manufacturer bought several tools. Inquiry is without feature. The long list for the Saco-Lowell shops for the new building at Lowell, Mass., is still open and buying against this is expected any day. The General Electric Co. is another prospective buyer for its plant at Lynn.

Prices remain stationary in practically all lines. One important drill manufacturer, however, has just announced a price reduction which averages about 10 per cent. Market authorities give this action considerable concern as it may be the forerunner of a downward revision in some other lines.

Inquiries Show Decrease

CINCINNATI, O., Jan. 8.—Intermittent buying of new machine tools for single installations; an increased inquiry rate from railroads; and a fairly large aggregate buying of used equipment are the outstanding features of the present week's machine tool market. Several new inquiries from the railroads are before the trade, involving boring mills and planers. Sales of new machines the past week included, two or three lathes, two milling machines, a boring mill and several planers, while a manufacturer of metal drilling machinery reported several sales, involving in the main single tools.

As indicated above, the used machinery market has been fairly active, but buyers are more particular than ever about the quality of the equipment so purchased. The Crosley Mfg. Co., which has taken over plant B of the Thomas J. Corcoran Lamp Mfg. Co., will be in the market in the near future for a list of equipment, used in the manufacture of radio sets and radio parts.

Market Is Good

CLEVELAND, Jan. 8.—December sales in most cases exceeded November, due to the decided increase in business found during the last two weeks of the year. This atcivity has continued through the past week, with a result that dealers and manufacturers anticipate a period of good business to follow. An encouraging feature of the present situation is the fact that business is coming from diversified industries, indicating a healthy condition of the machinery business.

Inquiries seem to be plentiful, small lists being the general rule. The Big Four, with a small list, furnishes the only raliroad inquiry. The automotive industry continues to buy. The General Electric Co. has purchased three of the largest size and two small type turret lathes from a local manufacturer. Other electric manufacturers are reported in the market for tools. Makers of special machines also report good business and have orders ahead sufficient to keep plants in operation from a month to six weeks at best.

Practically the same conditions is to be found in the market for used machines. A wave of buying developed about the middle of December and is continuing. Dealers anticipate a substantial busniess for the first part of the year.

Crane Awards and Inquiries of the Week

Orders Placed

One 5-ton I-beam crane for the Union Steel Casting Co., Pittsburgh, to a Michigan builder.

One 10-ton 3-motor electric traveling crane for the Lehigh Valley railroad, to the Whiting Corp., Harvey, Ill.

One 5-ton crane for the Steel Sales Corp., Chicago, to the Whiting Corp., Harvey, Ill.

One 15-ton pillar crane for the Monongahela Railway Co., Brownsville, Pa., to the Whiting Corp., Harvey, Ill.

One 25-ton locomotive crane for the Perth Amboy Drydocks Co., Perth Amboy, N. J., to the American Hoist & Derrick Co., St. Paul.

One road building machine to the Harbeson Lumber Co., Funiak Springs, Fla., to the American Hoist & Derrick Co., St. Paul.

One 20-ton locomotive crane for a Vancouver concern, going to the American Hoist & Derrick Co., St. Paul.

Two 5-ton derricks, 60-foot boom for the Turner Construction Co., New York, to the American Hoist & Derrick Co., St. Paul.

One 25-ton locomotive crane to the Browning Co., Cleveland; one used 25-ton Browning crane to the Hoisting Machinery Co.; two hoisting engines to the Lambert Hoisting Engine Co., and two hoisting engines to the J. S. Mundy Hoisting Engine Co., all for the Stillman, Delehanty & Ferris Co., Jersey City, N. J.

One 30-ton locomotive crane, 60-foot boom for I. T. Williams & Sons, Carteret, N. J., to the Locomotive Crane Co., Bucyrus, O.

One 5-ton electric crane, 57-foot span, for the Tottenville Copper Co., Tottenville, Staten Island, to the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

Six 1-ton electric hoists for the Federal Shipbuilding Co., Kearny, N. J., to Alfred Box & Co., Philadelphia.

One 4-ton electric hoist for a Mt. Vernon, N. Y., concern to Alfred Box & Co., Philadelphia.

Two 1-ton electric hoists for the Staten Island Shipbuilding Co. to Alfred Box & Co., Philadelphia.

One 5-ton electric crane, 80-foot span for the Anaconda Copper Co., 25 Broadway, New York, to the Whiting Corp., Harvey, Ill.

One 10-ton electric gantry crane, 40-foot span, for the Lehigh Valley railroad for installation at Sayre, Pa., to the Whiting Corp., Harvey, Ill.

One 5-ton electric crane, 48-foot span, for the David E. Allen Yonkers Foundry, Yonkers, N. Y., to the Whiting Corp., Harvey, Ill.

One 25-ton gantry crane, 54-foot span, 5-ton auxiliary, for the Brooklyn Eastern District Terminal Co., Brooklyn, to Chesapeake Iron works, Baltimore.

One 5-ton electric crane for the Philadelphia plant of the General Electric Co., to the Chesapeake Iron Works, Baltimore; this is in addition to two 5-ton cranes awarded the Chesapeake company for this plant.

One 15-ton crane for a large independent steel company in Pittsburgh to the Shaw Electric Crane Works, Muskegon, Mich.

One used locomotive crane for Hurwitz Bros., Syracuse, N. Y., to unnamed seller; crane is for installation at the company's Buffalo yards.

One 25-ton locomotive crane for the Pennsylvania railroad, Philadelphia, to the Browning Co., Cleveland.

One 25-ton locomotive crane for the Wagner Construction Co., Jersey City, N. J., to the Browning Co., Cleveland.

Two 7½-ton electric overhead cranes for the New Departure Mfg. Co., Bristol, Conn., to Shaw Electric Crane Co.

One 5-ton, 1-motor crane, 38-foot span, for the New York Central railroad to the Whiting Corp., Harvey, Ill., the crane is for installation at Selkirk, N. Y.

One 17½-ton locomotive crane for Babcock & Wilcox Co., Bayonne, N. J., to Industrial Works, Bay City, Mich.

One 27-ton locomotive crane, 55-foot boom, for the Interstate Iron & Steel Co., Chicago, to Industrial Works, Bay City, Mich.

One 10-ton electric traveling crane, 57-6-inch span, for the Lehigh Structural Steel Co., Philadelphia, to the Pawling & Harnischfeger Co., Milwaukee.

One 10-ton electric traveling crane for Illinois Central railroad, Chicago to the Whiting Corp., Harvey, Ill.

One 5-ton electric traveling crane for Steel Sales Corp., Chicago to the Whiting Corp., Harvey, Ill.

One 10-ton electric traveling crane for the Lehigh Valley railroad, New York, to the Whiting Corp., Harvey Ill.

One 5-ton hand-power traveling crane for the Walsh Construction Co. Davenport, Iowa, to the Whiting Corp., Harvey, Ill.

One 5-ton hand-power jib crane for the American Locomotive Co., New York, to the Whiting Corp., Harvey, Ill.

One 15-ton electric traveling crane for the Henry Pratt Boiler Co., Chicago, to the Whiting Corp., Harvey, Ill.

One 10-ton electric traveling crane for the International Process & Engineering Co., Harvey, Ill.

One 200-ton locomotive hoist for the Northwestern Pacific railroad, San Francisco, to the Whiting Corp., Harvey, Ill.

One 22-ton steam-operated standard-gage locomotive crane for city of Detroit, to the Orton & Steinbrenner Co., Chicago.

One 12-ton steam-operated standard-gage locomotive crane for the Richmond, Fredericksburg & Potomac railroad, Richmond, Va., to the Orton & Steinbrenner Co., Chicago.

One electric bucket-handling gantry crane for the A. M. Byers Co., Pittsburgh, to the Orton & Steinbrenner Co., Chicago.

One 20-ton locomotive crane, 40-foot boom, equipped with magnet and generator, placed by the American Brakeshoe & Foundry Co. for the Ramapo Ajax Corp., Hilburn, N. Y., with the Ohio Locomotive Crane Co.

One 200-foot monorail system, equipped with 1-ton hoists, for Frank P. Lasette, Long Island City, to the New Jersey Foundry & Machine Co.

One 10-ton 55-foot span, electric traveling crane for the Warren Steel Casting Co., St. Louis, to the Northern Engineering Works, Detroit.

One 5-ton 36-foot span, electric traveling crane for the Stephens Adamson Mfg. Co., Aurora, Ill., to the Northern Engineering Works, Detroit.

One 3-motor, 47-foot span, electric traveling crane for the Marshall Furnace Co., Marshall, Mich. to the Northern Engineering Works, Detroit.

One 50-ton, 63½-foot span, 4-motor electric traveling crane for the Virginian railroad, Norfolk, Va., to the Northern Engineering Works, Detroit.

Eighteen hand powered cranes for the American Steel & Wire Co., for their plants at Joliet, Ill. and Anderson, Ind., to H. D. Conkey & Co., Chicago.

One 10-ton 38-foot span power house crane for the village of Winnetka, Ill. to H. D. Conkey & Co., Chicago.

One 2-ton hand power crane for the Phoenix Utility Co., New York, to H. D. Conkey & Co., Chicago.

One 1-ton crane for the De La Vergne Machine Co., New York, to H. D. Conkey & Co., Chicago.

One 25-ton, 3-motor crane, 60-foot span, for the Lehigh Portland Cement Co., Allentown, Pa., to an unnamed builder. The crane is for shipment to Mason City, Iowa.

One 10-ton, electric overhead crane, 80-foot span for the American Electrical works, Phillipsdale, R. I., placed through Stone & Webster, Boston, with an unnamed builder.

One 20-ton electrically operated locomotive crane, for the Boston Elevated Railways, Boston, to Industrial Works, Bay City, Mich.

Fourteen electric overhead cranes for the Philadelphia plant of the General Electric Co. referred to as placed in recent issues, were distributed as follows: One 25-ton crane to an eastern builder, two 5-ton cranes Chesapeake Iron Works, two 10-ton cranes to Alfred Box & Co. and nine 3-ton cranes to Northern Engineering Works.

Orders Pending

One 10-ton crane for the Weirton Steel Co., Steubenville, O.; order to be placed this week.

Several cranes including two 20-ton, on 7½-ton and one each 10-ton, 15-ton and 20-ton cranes for plants of the Jones & Laughlin Steel Corp., Pittsburgh; orders to be placed soon.

One 15-ton or 30-ton electric traveling crane for the American Sheet & Tin Plate Co., Pittsburgh; decision not yet reached.

Small crane for the Elliott Co., Jeannette, Pa.; bids being taken.

Cranes for Jones & Laughlin Steel Corp. various plants; formal inquiries being issued.

Seven electric cranes for the Kearney, N. J., plant of the Western Electric Co. include one ½-ton crane, two 5-ton cranes, two 25-ton and two 30-ton cranes. One 25 and one 30-ton crane are to be equipped with auxiliary hoists. Bids were closed Dec. 26.

One 30-ton gantry crane for the Lehigh Valley railroad again up for figures.

Two 100-ton, 4-motor cranes, 75-foot span, equipped with 25-ton auxiliaries, for the Pittsfield, Mass., plant of the General Electric Co., bids asked .

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

FT. SMITH, ARK.—Warmack-Williams Stove Co. has been incorporated for $30,000 to manufacture stoves.

FT. SMITH, ARK.—The Ft. Smith Stove & Foundry Co. has been incorporated for $30,000 to carry on general foundry business and to manufacture stoves, parts, etc.

EMERYVILLE, CAL.—The Detroit Steel Products Co., 251 Kearny street, San Francisco, has taken bids on general contract for constructing 110 x 120-foot, 1-story reinforced concrete warehouse at Sixty-fourth and Doyle streets, here.

LOS ANGELES—Ferentzy Iron Works, Inc., has been incorporated with $50,000 capital stock.

LOS ANGELES—Hamlin Pump Co. has been incorporated for $500,000 to manufacture and deal in pumps, etc.

LOS ANGELES—California Steel Wheel Corp. has been incorporated for $50,000 to manufacture and deal in steel wheels, automobile accessories, etc.

REDLANDS, CAL.—Bell-Grassle Hardware Co. has been incorporated for $75,000 to manufacture and deal in hardware, metal products, etc.

SAN FRANCISCO—Herbert Machinery & Supply Co. has increased its capital stock from $100,000 to $500,000 to provide for expansions and improvements.

SAN FRANCISCO—Howard Automobile Co. of Los Angeles has been incorporated with $2,000,000 capital by R. L. Lipman, H. D. Costigan and J. D. Adams.

PUTNAM, CONN.—The Lowell Needle Co. is building factory here.

CHICAGO—Standard Sanitary Mfg. Co. has started constructing warehouse and garage at Iron street and Thirty-seventh place to cost about $500,000.

CHICAGO—The G. & W. Electric Specialty Co., 7440 South Chicago avenue, has purchased site at Kenwood and Kimbark streets where $60,000 plant will be constructed.

CHICAGO—R. L. Wilson & Co., 1851 Elston avenue, has contract for additions to Continental Can Co., 4633 West Grand avenue, costing about $700,000. Noted Dec. 13.

CHICAGO—The Coyne Trade & Engineering school, 1300 West Harrison street, will build a 5-story school and office building costing about $150,000 at Pauline and Congress streets. Building will contain vocational departments.

CHICAGO—Contracts have been awarded for constructing 2-story mill-construction machine and pattern shop at First avenue and First street, Maywood, for William A. Kennedy for about $35,000.

CHICAGO—The Red Point Mfg. Co., 77 West Washington street, has been incorporated for $15,000 to manufacture and deal in pumps, machinery, etc., by Joseph A. Golde, Philip E. Golde and others.

CHICAGO—Hydro Block Corp., 812 Wilson avenue, has been incorporated for $25,000 to manufacture and deal in building materials, fire proof building blocks, etc., by Fred C. Anderson, F. W. Johnson and H. L. Turner.

CHICAGO—Albaugh Dover Mfg. Co., 2100 Marshall boulevard, has been incorporated for $200,000 to manufacture and deal in washing machines, etc., by Peter A. Mortenson, Walter E. Smith and Rose B. Harter.

CHICAGO—Perfection Timing Gear Co., 213 North Morgan street, has been incorporated for $40,000 to manufacture and deal in motors, automobiles and boats by David H. Daskal, David Davis and George H. Daskal.

CHICAGO—Berry Bearing Co., 2711 North Michigan avenue, has been incorporated for $5000 to manufacture and deal in ball bearings, automobile parts and accessories, by L. Berry, C. J. Kostbade and J. B. Dax.

CHICAGO—Pittsburgh Coal Co. of Illinois, Old Colony building, has been incorporated for $25,000 to mine and market coal and coke, by W. K. Field, J. A. Donaldson, J. B. L. Hornberger, J. H. Woods, etc.

CHICAGO—International Car Co. plant at 1826 West Forty-third street, was damaged by fire Dec. 27 with about $100,000 loss. The wood mill shops suffered greatest loss. The plant built and repaired cars for the Pere Marquette railroad.

CHICAGO—Evans Schuster Co., 3704 South Western avenue, has been incorporated for $50,000 to manufacture and deal in automobiles, trucks, accessories, etc., by Nona C. Evans, James M. Evans, Raymond F. Schuster and Ruth M. Schuster.

CHICAGO—Eagle Wabash Corp., 426-8 South Wabash avenue, has been incorporated for $1,000,000 to manufacture and deal in lamps, shades, raw materials, etc., by David M. Polikoff, Rose Benjamin and William M. Tannenbaum.

CHICAGO—R. U. Tillotson Foundry Co., 1743 North Kenton avenue, has been incorporated to manufacture iron castings and conduct general foundry and machine shop, by Gerhard E. Barkling, Elizabeth R. Tillotson and Robert U. Tillotson.

CHICAGO—Utility Tool & Die Works, Inc., 126 South Clinton street, has been incorporated for $10,000 to manufacture and deal in machinery, tools, dies and metal specialties, by E. J. Gorman, John F. Vandam and J. L. Stroman. J. R. H. Potts, 8 South Dearborn street, is correspondent.

CHICAGO—The Gaertner Scientific Corp., 1201 Wrightwood avenue, has been incorporated for $50,000 and 2800 shares no par value stock to manufacture and deal in machinery, tools, etc., for educational and commercial purposes, by Willard L. King, F. Howard Eldridge and Herman L. Ellsworth.

CHICAGO—Foote Bros. Gear & Machine Co., 233 North Curtis street, has been incorporated with $800,000 capital and 80,000 shares no par value stock to manufacture and deal in machinery, gears, speed reducers, etc., by Aimee W. Foote, Leo J. Doyle, John T. Kerwin.

DEKALB, ILL.—Illinois Power Co., Springfield, Ill., plans $300,000 improvements to plants here and at Sycamore, Ill.

ROCKFORD, ILL.—Swords Electric Co., 623-29 Seventh street, has been incorporated for $100,000 to manufacture and deal in electrical supplies, etc., by T. E. Swords, D. F. Swords, I. L. Dougherty, S. E. Smith and H. K. Hutton. Charles E. Joyce, 317 West State street, is attorney.

ROCKFORD, ILL.—Elco Tool & Screw Corp., 1800 Fourteenth avenue, has been incorporated for $300,000 to manufacture and deal in tools, machinery, machinery parts, etc., by Harry O. Swanson, L. Faust, P. G. Swanson. Large & Reno, 501 Swedish American Bank building, is attorney.

WHITING, ILL.—Standard Oil Co. machine and boiler shops recently damaged by fire with loss of about $100,000 will be reconstructed.

INDIANAPOLIS—R. D. Eaglesfield, Inc., has been incorporated with $75,000 capital and 4000 shares no par value stock, to manufacture machinery, by Robert D. Eaglesfield, James T. Eaglesfield and P. H. Eaglesfield.

LOUISVILLE, KY.—Inland Waterways Co. will award contracts shortly for constructing $100,000 warehouse to be used by American Steel & Wire Co.

BALTIMORE—Flying Club of America plans two steel hangars, machine shop, radio station, etc., to house Maryland National Guard Air Unit. Capt. W. D. Tipton, Keyser building, is interested.

BALTIMORE—V. F. F. Mfg. Co., 3401 Alto avenue, has been incorporated for $10,000 to manufacture parking and stop lamps and other automobile accessories, by Eugene Stump, Benjamin Frank and others.

BALTIMORE—Calvert Engineering Co., 1209 Calvert building, has been incorporated for $25,000 to manufacture timing brushes for engines, by Henry Mann, George Goebel and others.

OAKLAND, MD.—United States Auto Twin Hooks & Chain Co. is receiving bids on electric welding machinery. Company will spend $20,000 in 1924 for erecting plant to manufacture automobile tire chains and chain hooks. Charles H. McIntire is president. Noted Dec. 27.

BOSTON—The Central Railway Signal Co. has been incorporated for $200,000 to manufacture appliances for railways, by M. L. Cox, Somerville, Mass.

BOSTON—The W. P. Stone Co. has been incorporated for $50,000 to manufacture and deal in vehicles by William P. Stone, Brookline, Mass.; Marshall I. Stone, Newton, Mass., and E. Dwight Fullerton, Dedham, Mass.

MONTAGUE, MASS.—The Electric Steel Casting Co. has been incorporated for $25,000 by Olaf Hoff Jr., Turners Falls, Mass.; Harold J. Bronson, Greenfield, Mass., and Olaf Hoff, Montclair, N. J.

BIG RAPIDS, MICH.—The Ornamental Bronze Co., recently incorporated, will manufacture bronze and aluminum specialties in a plant leased from Binney Machine Co. E. R. Deady is interested.

DETROIT—Buhr Metal Stamping Co. is reported as contemplating $500,000 branch plant on Pacific Coast.

DETROIT—Detroit Gasket & Mfg. Co. has been incorporated for $20,000 to engage in all kinds of lawful manufacturing by E. W. Diehl,

1342 Lakewood boulevard, Walter E. Ritter and Lloyd H. Diehl.

DETROIT—The Capital Brass Works, Inc., 2306 Franklin street, plans $37,000 4-story addition. General contract let to Harry M. Frier, 1302 Penobscot building.

DETROIT—National Screw Co. has awarded contract to Cadillac Iron Co. for erecting factory near its plant on Glover avenue at cost of $50,000.

FLINT, MICH.—General Parts Corp. has been incorporated for $250,000 to manufacture and deal in machinery, automobiles and automobile parts, by Lewis H. Bridgman, 814 East Kearsley street, Dallas E. Winslow and Frank Lay.

IRONWOOD, MICH.—A $1,000,000 high school containing vocational training department is planned. Architect Croft & Borner, Minneapolis, has plans. Contracts are to be awarded in January.

KALAMAZOO, MICH.—Clarage Fan Co. has been incorporated for $1,000,000 to do a general foundry and machine shop business, by Charles Clarage, 814 West Kalamazoo avenue, Roland R. Ware and Francis J. McMurdie.

LAPEER, MICH.—Bostick Stove Co. plans constructing new foundry to replace structure damaged by fire recently with $42,000 loss. Plant is idle until new foundry is completed.

MUSKEGON, MICH.—Continental Motors Corp. plans factory addition at Western avenue. R. W. Judson, 12801 East Jefferson avenue, Detroit, is president.

OWOSSO, MICH.—Construction is to begin shortly on brass foundry by Amos Kelly, Bay City.

SAGINAW, MICH.—Means Stamping Co. has been organized to make light metal stampings. The company will be incorporated for $20,000 by Ralph P. Means.

ST. LOUIS—Missouri Rolling Mill Corp. will erect 1-story steel storage and manufacturing plant at 2324 Ecoff street.

ST. LOUIS—United Accounting Machines, Inc., A. Bauman, president, has acquired buildings at 106 South Ninth street, and will improve and erect addition for manufacture of calculating machines.

WAPPAPELLO, MO.—The Taskee Iron & Ore Co. plans constructing concentrating mill and ore-washing plant. All machinery is to be electrically operated. Cost will total about $100,000. H. E. Springer and I. W. Rodgers are interested in company.

GARWOOD, N. J.—T. P. Carlson, Inc., 350 Spruce street, has been incorporated for $100,000 to carry on business of toolmaker, brass founder, machinist, etc.

IRVINGTON, N. J.—Arthur B. Shepard Co., Cleveland, bought site on Chancellor avenue here from Gould & Eberhardt Co. on which it will build 50 x 200-foot unit for manufacturing patented fabricated steel buildings which is the main product of the company. Arthur B. Shepard is president.

NEWARK, N. J.—Work will be started shortly by Newark Cutlery Mfg. Co. on erection of a $25,000 plant at Irvington, N. J.

NEWARK, N. J.—Consolidated Mold Co., 41 Commercial street, has been incorporated for $100,000 to manufacture steel molds for electrical insulation.

NEWARK, N. J.—Steffens-Amberg Co., operator of a brass and aluminum foundry, is revising plans for 4-story, 75 x 100-foot forge shop. A. T. Steffens, 262 Morris avenue, is in charge.

NEW BRUNSWICK, N. J.—W. E. Mount & Son, Inc., 99 Albany street, has been incorporated for $125,000 to manufacture and deal in agricultural implements, automobile accessories, etc.

WESTMONT, N. J.—A $60,000 electrically operated pumping station will be installed here in connection with new sewerage disposal plant. Remington & Vosbury, Camden, N. J., is engineer.

BROOKLYN, N. Y.—Radiotive Corp., 5317

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.25c
New York	3.54c
Philadelphia	3.47c
Pittsburgh	3.15c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.47c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.10c
New York	3.64c
Philadelphia	3.57c
Pittsburgh	3.25c
San Francisco	3.60c
Seattle (large shapes)	3.75c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston, 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.00c
New York	3.64c
Philadelphia	3.57c
Philadelphia, 3/16-inch	3.82c
Pittsburgh	3.25c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.515c
Buffalo	4.30c
Chicago	4.00c
Cincinnati	4.10c
Cleveland	3.60c to 4.06c
Detroit	4.15c
Los Angeles	5.00c
New York	4.34c
Philadelphia	4.10c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.10c
St. Paul	4.25c

NO. 28 BLACK SHEETS

Boston	5.00c
Buffalo	5.00c
Chicago	4.70c
Cincinnati	4.90c
Cleveland	4.50c to 4.65c
Detroit	4.85c
Los Angeles	6.20c
New York	4.50c to 4.70c
Philadelphia	5.15c
San Francisco	5.80c
Seattle	6.00c
St. Louis	4.75c
St. Paul	4.95c

NO. 28 GALVANIZED SHEETS

Boston	6.00c
Buffalo	6.10c
Chicago	5.85c
Cincinnati	5.90c
Cleveland	5.60c to 5.80c
Detroit	6.00c
Los Angeles	7.00c
New York	5.50c to 5.70c
Philadelphia	6.25c
San Francisco	6.50c
Seattle	6.75c
St. Louis	5.75c
St. Paul	5.75c to 6.00c

BANDS

Boston	4.315c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	4.90c
New York	4.39c
Philadelphia	4.27c
Pittsburgh	3.95c
San Francisco	4.50c
Seattle	4.75c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.27c
Pittsburgh	3.95c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.35c
Boston (shapes)	4.85c
Buffalo (rounds)	4.45c
Buffalo (shapes)	4.95c
Chicago (rounds)	4.00c
Chicago (shapes)	4.50c
Cincinnati (rounds)	4.25c
Cincinnati (shapes)	4.75c
Cleveland (rounds)	4.10c
Cleveland (shapes)	4.60c
Detroit (rounds)	4.30c
Detroit (shapes)	4.80c
Los Angeles (rounds)	5.60c
New York (rounds	4.40c
New York (shapes)	4.90c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
Pittsburgh (rounds)	4.05c
Pittsburgh (sq. hex. and flats)	4.55c
San Francisco (rounds)	5.50c
Seattle (rounds)	5.50c
St. Paul (rounds)	4.25c

WELDED PIPE

Discounts from warehouse, New York City

Standard Steel Pipe

	Black	galvanized
¼-⅜-inch butt	—31	+ 2
½-inch butt	—41	—24
¾-inch butt	—46	—32
1/3-inch butt	—48	—34
3½-6-inch lap	—44	—30
7-8-inch lap	—41	—11
9-10-inch lap	—35	— 8
11-12-inch lap	—34	— 6

Wrought Iron Pipe

	Black	galvanized
¼-⅜-inch butt	+44	+78
½-inch butt	— 4	+19
¾-inch butt	—11	+ 9
1-1½-inch butt	—14	+ 6
2-inch lap	— 5	+14
3-6-inch lap	—11	+ 6
7-12-inch lap	— 3	+16

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago**
San Francisco
Cincinnati **Detroit**

Twenty-first avenue, manufacturer of radio equipment, plans 3-story, 90 x 100-foot addition costing $65,000.

BROOKLYN, N. Y.—Fager Sheet Metal Works has been incorporated for $25,000 by G. A. and G. W. and F. Fager. Reed & Bassford, 2 Rector street, is attorney.

BROOKLYN, N. Y.—Egbert Concrete Products Co. has been incorporated for $100,000 for manufacturing purposes by G. W. and G. W. Egbert Jr., and W. B. Cruikshank. G. W. Titcomb, 215 Montague street, is attorney.

BROOKLYN, N. Y.—S. T. S. Tinware Mfg. Co. has been incorporated for $2000 to manufacture metalware, by D. S. Eblick, H. Tolchin and D. Schneider, with Barfield, Joondeph, Turkat & Diamond, 44 Court street, as attorney.

BROOKLYN, N. Y.—Brooklyn Metal Stamping Corp. has been incorporated for $10,000 by D. H. Engleson, G. Weinstein and J. C. Fishel to manufacture and deal in metal stampings. O. L. Dann, 291 Broadway, is attorney.

BUFFALO, N. Y.—United States Headlight & Mfg. Co. has been incorporated for $150,000 by R. E. Johnson, E. H. Castle and D. J. Carson. Kellogg, Babcock & Sullivan is attorney.

MIDDLETOWN, N. Y.—Clemson Saw Co., Inc., has been incorporated for $1,000,000 to manufacture and deal in saws of all kinds by George Clemson, R. O. Clemson and N. E. Gross, with Cornell, Lockwood & Jeffrey, 2 Rector street, New York, as attorney.

NEW YORK—Golden-Leutz has been incorporated for $30,000 to build motors, by H. R. Rising and C. R. Neal, with R. Swezey, 50 Pine street, as attorney.

NEW YORK—Starburn Products, Inc., 600 West Forty-third street, has been incorporated to manufacture metal sprays and specialties, by Kenneth Burns of Joblez Burns & Sons.

NEW YORK—Star Machine Tool & Die Works has been incorporated for $5000 by J. and B. Codos and B. May, with Kirk & Diamon, 305 Broadway, as attorney.

NEW YORK—Henry Frank Jr. has been incorporated for $100,000 to manufacture and deal in hardware, by H. Frank and H. Paul, with J. T. Booth, 1442 Woolworth building, as attorney.

NEW YORK—National Steam Bus Corp. has been incorporated for $100,000 for manufacturing purposes, by H. Lenchus, L. A. Doyle and J. S. Sporn, with A. G. Proven, 155 Nassau street, as attorney.

NEW YORK—Western Electric Co., 195 Broadway, Charles G. DuBois, president, plans 11-story, 80 x 128-foot, brick factory at 744-54 Washington street. General contractors' bids are asked.

NEW YORK—H. Romeyn Smith has been incorporated for $50,000 to manufacture and deal in plumbers' supplies, by H. R. and E. P. Smith, and H. A. Manchester. Cannon & Cannon, 135 Broadway, is attorney.

BROOKLYN, N. Y.—Pitz Foundry has been incorporated for $300,000 to make iron castings, by J. F. and R. G. and J. F. Pitz Jr., with Schlesinger & Schlesinger, 17 East Forty-second street, New York, as attorney.

NEW YORK—T. E. Conklin Brass & Copper Co. has been incorporated for $600,000 to make and deal in brass and copper, by T. B. and H. S. and F. R. Conklin. Geller, Rolston & Blanc, 22 Exchange place, is attorney.

NEW YORK—West End Metal Strip Co. has been incorporated for $10,000 to manufacture and deal in weather stripping by S. Mellnick and M. Goldmacher. A. Gross, 261 Broadway, is attorney.

NEW YORK—Mauser Arms Co. has been incorporated with 200 shares no par value stock, by E. T. Kelly, H. H. A. Meyn and T. McErlean, with Brissen & Schrenck, 50 Church street, as attorney.

NEW YORK—Hatheway & Co. has been incorporated for $10,000 to manufacture and deal in electrical machinery, by G. L. Hatheway, R. D. Patterson and J. A. Byrne with Ingraham, Page & Moran, 14 Wall street, as attorney.

NEW YORK—C. & O. R. Corp. has been incorporated for $50,000 to manufacture and deal in electrical instruments, etc., by G. Sheehan, J. Thow and M. L. Greenburg, with N. Vivader, 25 West Forty-third street, as attorney.

NEW YORK—Rankin Motor Co. has been incorporated with 200 shares no par value common stock by A. L. Rankin, C. F. Kenny and E. J. Garrity to build marine motors and engines. J. P. Nolan, 25 Broad street, is attorney.

NEW YORK—Edwin R. Knapp Co. has been incorporated with 120 shares preferred stock and 180 common no par value to manufacture and deal in metal products and refractories, by M. L. Murray and E. Wells. J. Gerdes, 41 Park Row, is attorney.

QUEENS, L. I., N. Y.—Shearing & Davis Mfg. Co. has been incorporated for $2500 to conduct general machine shop, by H. P. Davis, C. H. Shearing and R. H. Nicholl. J. J. Hegt, 126 Liberty street, New York, is attorney.

QUEENS, L. I., N. Y.—Duff-Dry Long Island Distributors, Inc., has been incorporated for $100,000 to manufacture machinery, etc., by Herbert G. and Frederick W. Saltzsieder, 5 Remsen street, Jamaica, L. I., and Samuel L. Scheer, 717 West 177th street, New York.

ROCHESTER, N. Y.—Carbod Corp. has been incorporated with 200 shares common stock, no par value, to manufacture and deal in metals and products, by O. F. Gurney, C. S. Smith and R. S. Moddy, with Wilder, Smith & Lamb as attorney.

ASHTABULA, O.—Ashtabula Steel Sheet Co. plans 60-foot enlargement of plant. Cold rolled and finishing departments will be moved to provide for another hot roll.

CLEVELAND—Blake Piston Ring Co. has been incorporated for $500 by John T. Blake and Joseph M. Blake.

CLEVELAND—Four Way Lock Co. has been incorporated for $50,000 to take over a going plant and manufacture patented locks and locks for general purposes. John A. Elden is attorney.

YOUNGSTOWN, O.—Youngstown Welding Co. plans 1-story sheet metal and steel frame building. W. D. McKay, 536 West Rayen avenue, is president.

New Trade Publications

FLASKS—The J. S. McCormick Co., Pittsburgh, recently issued a bulletin of foundry flasks. New types of snap, taper and steel flasks and allied equipment are shown.

ACETYLENE—The Air Reduction Sales Co., 342 Madison avenue, New York, has published a 10-page pamphlet in which the proper methods for caring for oxygen and acetylene cylinders are outlined.

LADLES—The J. S. McCormick Co., Pittsburgh, has published a new catalog of its line of foundry equipment and ladles. Various types and sizes are shown as well as the necessary safety features.

RIVET HEATING FURNACES—An oil-fired rivet heating furnace is described in a recent bulletin of the F. J. Ryan & Co., Philadelphia. The bulletin contains illustrations of the furnace and a sectional diagram showing the various features.

PORTABLE DRILL—A high speed drill designed for wood or metal drilling in automobile body work or car building is described and illustrated in a bulletin of the Hisey-Wolf Machine Co., Cincinnati. The important features of the machine are mentioned.

ELECTRIC HEATERS—"Strips of Electric Heat" is the subject of a folder issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., describing an electric heater designed for heating out of the way places. The heater operates on either 220 or 100 volts.

CRANES—The Whiting Corp., Harvey, Ill., has published a folder containing a list of some of the numerous power house installations made by this company, a description of some of the major parts of power house cranes and illustrations of the parts described.

CAR PULLER—An electric capstan car puller is described in a recent bulletin of the Silent-Hoist-Co., Brooklyn, N. Y. This machine is used for spotting cars and is operated by one man. Where electric power is not available, a gasoline drive is provided.

STOKER—The Combustion Engineering Corp., Broad street, New York, has issued a folder describing and illustrating a new stoker which operates on the underfeed principle. Special features of design are discussed and representative installations listed.

WELDING—The International Oxygen Co., Newark, N. J., is distributing a small memorandum book which was compiled with the idea of furnishing the user of compressed gases with answers to many questions arising in daily practice.

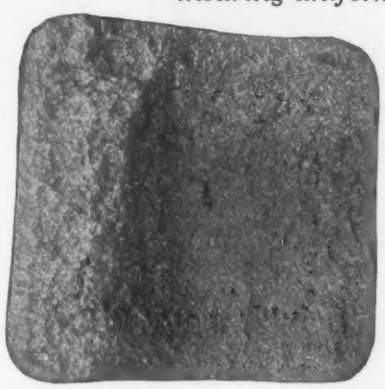
BUCKET HANDLING CRANES—The Whiting Corp., Harvey, Ill., has issued a folder on bucket handling cranes. Views of various installations are included showing overhead travelers, gantry cranes and stationary transfer cranes adapted to the handling of coal, cement, cinders, fertilizers, etc.

PULVERIZER COAL—The Fuller-Lehigh Co., Fullerton, Pa., has published a 32-page booklet on pulverized coal for boilers. Descriptions and illustrations of the equipment used to prepare or pulverize, convey, feed and burn pulverized coal are presented. Systems for transporting the powdered coal by means of air also are described. Drawings show a pulverized coal preparation plant and installations of burners adapted to various conditions.

EVERY STEEL USER Should Keep This in Mind!

The Basis of all good Steel Products is Bottom Poured Ingots.

Mansfield Steel not only is slowly bottom poured, but also, while each heat is being worked, from six to twelve sample tests are taken, thus insuring uniformity and exactness to specification.



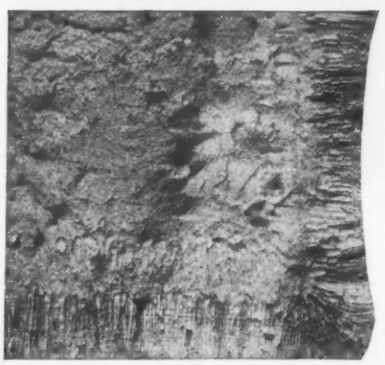
To the left is a view of a Mansfield 15" x 16" *bottom* poured ingot, fractured in the middle of the ingot.

Note the solid and uniform appearance of the fracture, with a single line of blow holes more than two inches beneath the outer skin of the ingot. These blow holes, during the process of rolling, flatten down and the sides weld together.

Had this ingot been *top* cast it would have required only 25 seconds to cast, but, being *bottom* cast—in groups of twelve—between four and five minutes were required, thus permitting the gases which cause blow holes, to pass off during the slow pouring. This slow pouring also reduces the amount of pipe cavity in the ingot.

Another advantage of the small ingot is that the metal after being poured solidifies more rapidly, which reduces the danger of segregation, and gives a more homogeneous steel.

Mansfield Bottom Poured Ingots are the basis of all good Steel Products!



See the Difference?

To the left is a view of a fracture of an 18" x 20" top-poured ingot of a similar grade of steel as shown above.

Note the blow holes 1½" long, lying next to the outer skin of the ingot. These blow holes, tearing from one to the other during the process of rolling, produce seams in the finished bar or sheet. These blow holes are caused by gases in the steel, the greater part of which *slow* pouring would have eliminated.

MANSFIELD
QUALITY SHEETS
WABIK METAL

A special material for Vitreous Enameling, for Stove Door Panels, Splasher Backs, Broiler Pans, Table Tops, Refrigerators, Signs, and other flat work. Other Specialties:—Automobile Sheets Body Stock; Flat Fender and Hood Stock; Cowl Stock; Radiator Casing Stock; Crown Fender Stock; Metal Furniture Sheets; Pickled and Annealed Enameling Stock for Kitchen Utensils; Milk Can Stock. "Mansfield" Steel is the ultimate in Sheet Bars and in Sheets. It means satisfaction to the many users. Constant study of the needs of users, and continuous application of the results of such study, in the way of improved methods in our plants has established a reputation for reliability unsurpassed.

WABIK

SHEET BARS.....INGOTS

MANSFIELD SHEET & TIN PLATE COMPANY

MANSFIELD, OHIO

DISTRICT SALES REPRESENTATIVES

The L. D. Rockwell Co., 1106 National City Bldg., New York, N. Y.
Mansfield Sheet & Tin Plate Co., Wrigley Bldg., Chicago, Ill.
Mr. Geo. W. House, 1822 Ford Building, Detroit, Mich.
The L. D. Rockwell Co., 1512 B. F Keith Bldg., Cleveland, O.
Walter G. Clark, Inc., 106 N. Third St., St. Louis, Mo.
Walter G. Clark, Inc., 313 American Bank Bldg., Kansas City, Mo.
Mr. C. H. Beach, 617 Merchants Bank Bldg., Indianapolis, Ind.
Mr. A. P. Grenier, 640 Endicott Bldg., St. Paul, Minn.
Mr. Herbert P. Hill, 401 Continental Trust Bldg., Washington, D. C.
Wm. P. Horn Co., 237 Rialto Bldg., San Francisco, Cal.
Wm. P. Horn Co., 301 Kerchoff Bldg., Los Angeles, Cal.
Wm. P. Horn Co., Dekum Building, Portland, Ore.
Wm. P. Horn Co., 1426 L. C. Smith Bldg., Seattle, Wash.

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range bessemer, 55 per cent iron..$6.45
Mesabi bessemer, 55 per cent iron.... 6.20
Old Range nonbessemer, 51½ per cent iron 5.70
Mesabi nonbessemer, 51½ per cent iron 5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent ..... 10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent..... 13.25 to 16.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent ..... 9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent..... 10.00 to 10.50
Swedish and Norwegian low phosphorus, 68 per cent.... 11.00 to 12.00
Swedish foundry or basic, 66 to 68 per cent ..... 9.25 to 10.00
Spanish foundry or basic, 50 to 54 per cent..... 9.00

Manganese Ores

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent.....
.....40 to 42 cents c.i.f. tidewater
Indian, minimum 47 per cent.....
.....40 to 42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent.....
.....43 cents c.i.f. tidewater

Fluor Spar

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton..$19.75 to 23.50
Washed gravel, imported, duty paid eastern tidewater, per gross ton ..... 20.60 to 21.10

Rivets

Structural rivets, Pittsburgh.. 2.90c
Rivets, 7/16-in. and smaller.....
.....65, 10 and 5 off

Nuts and Bolts

(Up to 1¼ and 1½ inches inclusive)

Hot pressed square or hexagon blank .....$4.50 off list
Hot pressed square or hexagon tapped .....$4.50 off list
Cold punched square or hexagon blank .....$4.25 off list
Cold punched, square or hexagon.... .....$4.25 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger.....75 and 5 off
Cold punched semifinished hexagon nuts 9/16-inch and smaller.....80 and 5 off
Price f.o.b. Pittsburgh, packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread .....60 and 10 off
Cut thread .....60 off
Larger and longer.....60 off

MACHINE BOLTS
(⅜ x 4 inches, hot pressed nuts)

Rolled thread.....60, 10 and 10 off
Cut thread .....60 and 10 off
Larger and longer .....60 and 10 off
((⅜ x 4 inches, cold punched nuts)
Cut thread .....50, 10 off
Larger and longer .....50, 10 off
Lag screws .....65 and 10 off
Plow bolts Nos. 1, 2 and 3 heads.....
.....50 and 10 off
4 to 10 heads .....50-10 + 20 off
Flat and round head stove bolts.....
.....75, 10 and 5 off
Other stove bolts .....75 and 5 off
Tap bolts .....25 and 10 off
Bolt ends with hot pressed nuts.....
.....60 and 10 off
Bolt ends with cold punched nuts....
.....50 and 10 off
Blank bolts .....60 and 10 off
Rough stud bolts with nuts.....
.....50 off

WASHERS

Wrought washers .....$5.00 to $5.50 off

Steel Pipe

(Effective April 19, 1923)
Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	60	48½
Lap Weld		
2-inch	53	41½
2½ to 6-inch	57	45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½
Lap Weld		
2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	42	32½
¾ to 1¼-inch	45	35½
2 to 2½-inch	47	37½
Lap Weld		
2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)
Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS		
Butt Weld		
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)
(Effective April 19, 1923)

2 and 2¼-inch ..... 23 off
2½ and 2¾-inch ..... 33 off
3-inch ..... 36 off
3¼ to 3¾-inch .....38½ off
4 to 13-inch ..... 42 off

CHARCOAL IRON
(Effective April 12, 1923)

1½-inch .....+22
1¾-inch .....+12
2 and 2¼-inch .....+ 2
2½ to 3-inch 3
3¼ to 4½-inch 5

SEAMLESS COLD DRAWN
(Effective April 19, 1923)

1-inch ..... 51 off
1¼ and 1½-inch ..... 43 off
1¾-inch ..... 27 off
2 and 2¼-inch ..... 18 off
2½ and 2¾-inch ..... 28 off
3 and 3¼-inch ..... 32 off
3½ and 3¾-inch ..... 33 off
4-inch ..... 37 off
4½ and 5-inch ..... 29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch ..... 34 off
3½ and 3¾-inch ..... 35 off
4-inch ..... 39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING
Base Discounts

Carbon, 0.10 to 0.20 per cent..... 83 off
Carbon, 0.30 to 0.40 per cent..... 81 off
Carbon, 0.40 to 0.50 per cent....net price
Plus differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES
(Effective April 19, 1923)

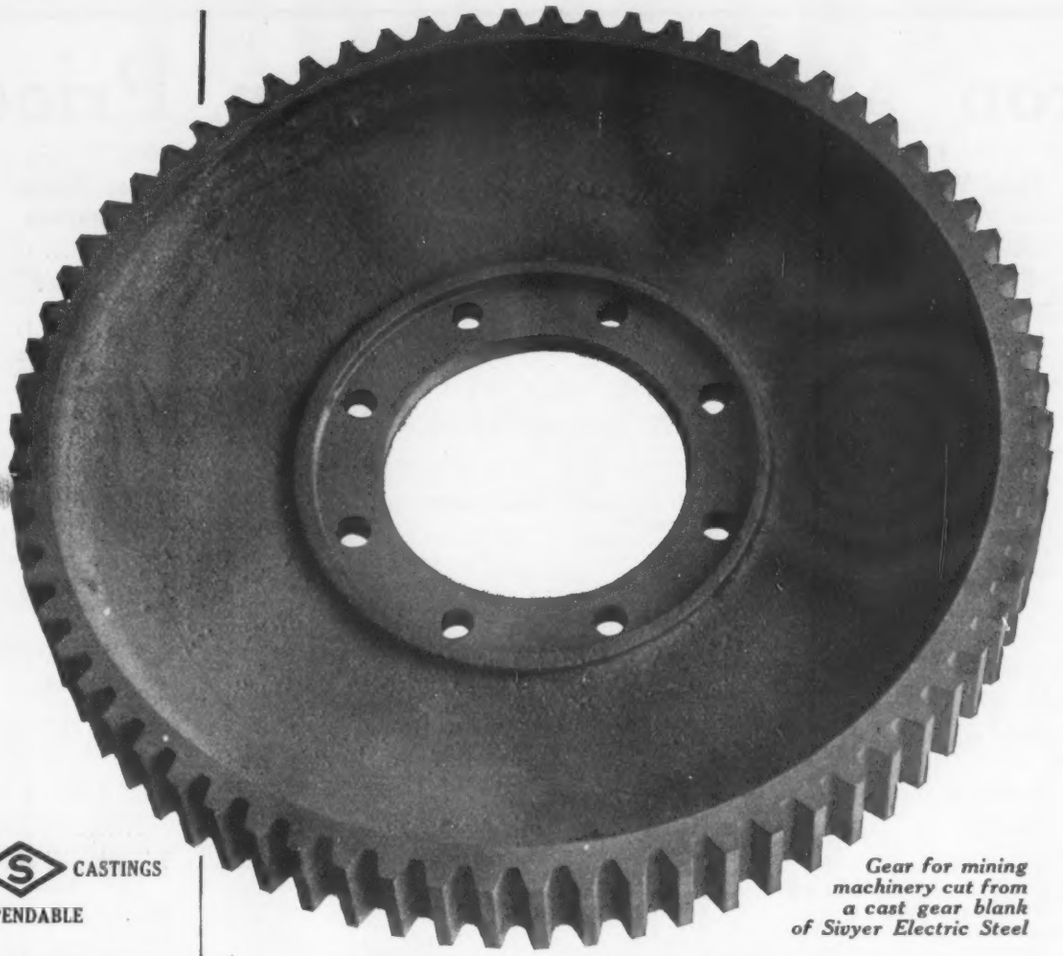
Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	15c
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.

Hot Rolled Alloy Steels

Prices per pound, Pittsburgh

S. A. E. Series—
2300 (3½ per cent nickel)..... 5.00 to 5.25c
3100 (nickel chromium)..... 4.00 to 4.25c
6100 (chrome vanadium)..... 5.00c
6100 (chrome vanadium spring) 4.75c
9250 (Silico manganese spring) 3.90c



Gear for mining machinery cut from a cast gear blank of Sivyer Electric Steel

SIVYER (S) CASTINGS

DEPENDABLE

Send Blue Prints

If certain parts of your product—which are now either cast or hammer-forged and welded—ought to be more effectively safeguarded against failure in service, send us your blue prints with an explanation of your difficulties. We will be glad to study the problems involved and recommend possible solutions without obligation on your part.

If some of your planing and boring tools require an unusual amount of grinding and replacement, it may be that there are sand and slag on the surface of some of the castings now used. Tools are keen inspectors of castings and originate many of the orders that come to Sivyer from more than a thousand miles away. If your usual sources of supply seem unable to get rid of the trouble, send us your blue prints of the parts in question, together with details about your difficulties. Without obligation on your part we will study the problems of molding practice involved and suggest methods for producing castings with uniformly good machining quality.

Illustrating Interior and Exterior Integrity

CUT gears, like the one above, illustrate the uniformly honest surfaces and thoroughly sound interior of Sivyer Electric Steel Castings. To show the satisfactory machining costs established by castings like this, the surfaces have to be uniformly free from sand and slag. In addition, the interior of the casting must be free of imperfections — or rejections after partial machining would increase the cutting expense. The low cost of cutting gears from Sivyer blanks is, therefore, most interesting evidence of interior and exterior integrity. It is this uniform honesty that is leading so many manufacturers of mining machinery to use castings of Sivyer Electric Steel to safeguard their product against failures in service.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	13.50 to 14.00
Boston (dealers)	12.00 to 13.00
Buffalo	18.00 to 19.00
Chicago	16.25 to 16.75
Cleveland	16.50 to 17.00
Cincinnati	15.00 to 15.50
Detroit (dealers)	15.50 to 16.00
Eastern Pennsylvania	17.50 to 18.00
New York (dealers)	13.00 to 13.50
Pittsburgh	20.00
St. Louis	17.00 to 17.50
Valleys (nominal)	17.75 to 18.25
No. 1 railroad steel New York (dealers)	13.75 to 14.25

COMPRESSED SHEETS

Buffalo	16.00 to 16.50
Chicago	13.50 to 14.00
Cleveland	14.00 to 14.25
Detroit (dealers)	13.50 to 14.00
Pittsburgh	18.50 to 19.00
Valley	15.75 to 16.25

BUNDLED SHEETS

Buffalo	11.00 to 12.00
Cincinnati	12.00 to 12.50
Cleveland	12.00 to 12.25
Detroit	9.50 to 10.50
Eastern Pennsylvania	15.00 to 15.50
Pittsburgh	17.00 to 17.50
St. Louis	10.50 to 11.00
Valley	14.00 to 14.25

SHEET CLIPPINGS, LOOSE

Chicago	8.50 to 9.00
Detroit	8.50 to 9.00

STEEL RAILS, SHORT

Birmingham	12.00 to 13.00
Boston (dealers)	13.50 to 14.00
Chicago	19.50 to 20.00
Cincinnati	19.50 to 20.00
Cleveland	15.50 to 15.75
St. Louis	20.00 to 20.50

STOVE PLATE

Birmingham	17.00 to 17.50
Boston (consumers)	16.00 to 16.50
Buffalo	18.00 to 18.50
Pittsburgh	16.00 to 16.50
Chicago	19.50 to 20.00
Cincinnati (net iron)	13.00 to 13.50
Cleveland	18.00 to 18.50
Detroit (net ton) (dealers)	14.50 to 15.00
Eastern Pennsylvania	17.00 to 17.50
New York (dealers)	13.00 to 14.00
Pittsburgh	16.00 to 16.50
St. Louis	18.50 to 19.00

LOW PHOSPHORUS

Buffalo	21.00 to 22.00
Cincinnati	15.00 to 15.50
Eastern Pennsylvania	21.00 to 22.00
Pitts., Billets and bloom crops	23.50 to 24.00

SHOVELING STEEL

Chicago	16.00 to 16.50
Pittsburgh	16.00 to 16.50
St. Louis	17.00 to 17.50

KNUCKLES, COUPLERS, SPRINGS

Chicago	20.00 to 20.50
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.50 to 22.00
St. Louis	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	16.50 to 17.00
Eastern Pennsylvania	17.50 to 18.00
St. Louis	18.25 to 18.75

BOILER PLATE, CUT

St. Louis	11.75 to 12.25

ANGLE BARS—STEEL

Chicago	18.75 to 19.25
St. Louis	18.00 to 18.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	12.00 to 13.00
Boston (dealers)	14.00 to 14.50
Buffalo	15.50 to 16.00
Cleveland, No. 1	14.50 to 15.00
Chicago, No. 1	17.00 to 17.50
Chicago, No. 2	16.25 to 16.75
Cincinnati, No. 1	13.50 to 14.00
Detroit, No. 2	15.00 to 15.50
Eastern Pennsylvania	19.00 to 20.00
New York, No. 1 (dealers)	14.75 to 15.25
Pittsburgh, No. 1	16.00 to 16.50
Pittsburgh, No. 2	20.00
St. Louis, No. 1	16.50 to 17.00
St. Louis, No. 2	17.00 to 17.50

WROUGHT PIPE

Boston (dealers)	11.00 to 12.00
Buffalo	13.50 to 14.00
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	12.75 to 13.25

YARD WROUGHT

Boston	12.00 to 13.00
Eastern Pennsylvania	18.00 to 19.00

CITY WROUGHT

New York, long	12.75 to 13.25

BUSHELING

Buffalo	15.50 to 16.00
Chicago, No. 1	14.50 to 15.00
Chicago, No. 2	9.00 to 9.50
Cincinnati, No. 1	12.00 to 12.50
Cleveland, No. 1	12.50 to 12.75
Cleveland, No. 2	10.00 to 10.25
Detroit, No. 1	13.00 to 13.50
Detroit, No. 2 (new)	12.50 to 13.00
Detroit, No. 2 (old)	10.00 to 11.00
Eastern Pennsylvania	16.00 to 17.00
Pittsburgh, No. 1	17.00 to 17.50
St. Louis, No. 1	16.25 to 16.75

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston (dealers)	9.50 to 10.00
Buffalo	12.50 to 13.00
Chicago	10.00 to 10.50
Cincinnati	10.50 to 11.00
Cleveland	12.75 to 13.00
Detroit (dealers)	11.50 to 12.00
Eastern Pennsylvania	15.00 to 15.50
New York (dealers)	10.50 to 11.00
Pittsburgh	15.00 to 15.50
St. Louis	10.00 to 10.50
Valleys	12.75 to 13.25

CAST IRON BORINGS

Birmingham (chemical)	16.00 to 17.00
Birmingham (plain)	8.00 to 9.00
Boston (chemical)	11.50 to 12.00
Boston (dealers)	9.50 to 10.00
Buffalo	13.50 to 14.00
Chicago	12.50 to 13.00
Cincinnati	12.00 to 12.50
Cleveland	13.50 to 13.75
Detroit (dealers)	12.00 to 12.50
Eastern Pennsylvania (chem.)	15.00 to 16.00
Eastern Pennsylvania	14.00 to 15.00
New York (dealers' price)	9.75 to 10.25
Pittsburgh	16.00 to 16.50
St. Louis	14.00 to 14.50
Valleys	14.25 to 14.75

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	9.00 to 9.50
Cleveland	13.75 to 14.00
Detroit (dealers)	11.00 to 11.75
Eastern Pennsylvania	12.00 to 13.00
New York (dealers)	9.50 to 10.00

IRON AXLES

Birmingham	20.00 to 21.00
Boston (consumers)	31.00 to 32.00
Buffalo	28.00
Chicago	28.50 to 29.00
Cincinnati	23.00 to 23.50
Eastern Pennsylvania	25.00 to 30.00
New York (dealers)	25.75 to 26.25
St. Louis	28.00 to 28.50

IRON RAILS

Buffalo	20.00 to 21.00
Chicago	19.50 to 20.00
Cincinnati	15.50 to 16.00
St. Louis	17.50 to 18.00

PIPES AND FLUES

Chicago	11.50 to 12.00
Cincinnati	10.00 to 10.50
Cleveland	12.50 to 13.00
St. Louis	13.00 to 13.50

RAILROAD GRATE BARS

Buffalo	16.50 to 17.00
Chicago	17.75 to 18.25
Cleveland	18.00 to 18.50
Eastern Pennsylvania	17.50 to 18.50
New York (dealers)	14.25 to 14.75
St. Louis	17.00 to 17.50

FORGE FLASHINGS

Boston (dealers)	9.00 to 10.00
Chicago, small	11.50 to 12.00
Cleveland, small	12.75 to 13.00
Cleveland, large	12.75 to 13.00
Detroit (dealers)	11.50 to 12.50

FORGE SCRAP

Boston (dealers)	9.00 to 10.00
Chicago	16.25 to 16.75
Eastern Pennsylvania	14.00 to 14.50

ARCH BARS AND TRANSOMS

Chicago	24.00 to 24.50
St. Louis	23.50 to 24.00

ANGLE BARS—IRON

Chicago	23.00 to 23.50
St. Louis	24.00 to 24.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	9.50 to 10.00
Buffalo	15.00 to 15.50
Chicago	14.00 to 14.50
Cleveland	14.00 to 14.25
Eastern Pennsylvania	15.50 to 16.00
Pittsburgh	17.50 to 18.00
St. Louis	13.00 to 13.50

STEEL CAR AXLES

Birmingham	19.00 to 20.00
Boston (consumers)	20.00 to 21.00
Buffalo	19.00 to 20.00
Chicago	20.50 to 21.00
Cleveland	19.00 to 20.00
Eastern Pennsylvania	21.00 to 23.00
New York (dealers)	15.25 to 15.75
Pittsburgh	21.50 to 22.00
St. Louis	20.00 to 20.50

SHAFTING

Boston (consumers)	20.50 to 21.00
Chicago	23.50 to 24.00
Eastern Pennsylvania	23.00 to 25.00
New York dealers)	14.75 to 15.25
St. Louis	20.00 to 20.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	18.00 to 19.00
Birmingham, iron	13.00 to 14.00
Boston (consumers)6	20.00 to 20.50
Buffalo	19.50 to 20.00
Chicago, iron	20.00 to 20.50
Cincinnati	15.00 to 15.50
Eastern Pennsylvania	19.50 to 20.50
New York iron (dealers)	15.50 to 16.00
Pittsburgh, iron	20.00 to 20.50
Pittsburgh, steel	21.50 to 22.00
St. Louis, iron	19.00 to 19.50

NO. 1 CAST SCRAP

Birmingham, cupola	19.00 to 20.00
Boston (consumers)	22.50 to 23.00
Buffalo	19.50 to 20.50
Chicago, cupola	21.50 to 22.50
Cincinnati No. 1 machinery cupola (net tons)	19.50 to 20.00
Cleveland, cupola	21.00 to 22.00
Detroit (net tons) (dealers)	18.00 to 18.50
Eastern Pennsylvania, cupola	20.00 to 21.00
New York, cupola (dealers)	17.25 to 17.75
Pittsburgh, cupola	21.00 to 21.50
San Francisco	25.00 to 26.00
St. Louis, railroad	20.50 to 21.00
St. Louis, agricultural	20.50 to 21.00
Valleys	21.00 to 22.00

HEAVY CAST

Boston (consumers)	18.00 to 19.00
Buffalo (breakable)	16.50 to 17.00
Cleveland	16.00 to 16.25
Detroit (automobile) (net ton)	22.50 to 23.00
Eastern Pennsylvania	18.00 to 18.50
New York (dealers)	16.75 to 17.25
Pittsburgh	19.00 to 19.50

MALLEABLE

Boston (railroad)	18.00 to 19.00
Buffalo	20.00 to 21.00
Chicago, railroad	20.00 to 20.50
Chicago, agricultural	19.00 to 20.00
Cincinnati, agricultural	16.00 to 16.50
Cincinnati, railroad	16.00 to 16.50
Cleveland, agricultural	19.50 to 20.00
Cleveland, railroad	20.00 to 20.50
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania, railroad	17.00 to 18.00
Pittsburgh, railroad	17.50 to 18.00
St. Louis, agricultural	18.50 to 19.00
St. Louis, railroad	18.75 to 19.25

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	15.00 to 15.50
Boston (dealers)	14.00 to 14.50
Chicago	18.00 to 18.50
Cleveland	17.50 to 18.00
Detroit	15.50 to 16.00
Eastern Pennsylvania	19.00 to 20.00
New York (dealers)	14.25 to 14.75
Pittsburgh district	22.00 to 22.50
St. Louis	19.00 to 19.50

LOCOMOTIVE TIRES

Chicago	18.25 to 19.25
St. Louis	18.00 to 18.50

LOW PHOSPHORUS PUNCHINGS

Chicago	17.75 to 18.25
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.50 to 22.00